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WILDLIFE IN NORTH CAROLINA

NORTH CAROLINA Wildlife RESOURCES COMMISSION

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EDITOR'S NOTE

The state of North Carolina has been stocking trout for more than 130 years. Granted, early efforts by the state's first fish commission in the 19th century were spotty and accomplished little, with the exception of introducing rainbow trout to the state.

Well into the 20th century, the forerunner of the U.S. Fish and Wildlife Service shipped rainbow, brook, brown, steelhead (an ocean-run rainbow) and lake trout into North Carolina. The introduction of these fish was willy-nilly, and for some of that period, if you wanted trout, all you had to do was ask your congressman, who forwarded your request to the federal agency.

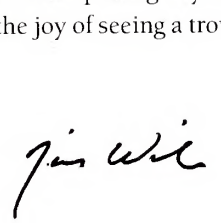
MELISSA McGAW/NCWRC

In 1947, the N.C. Wildlife Resources Commission was formed, and that agency took over much of the stocking of trout. Today, thanks to the commission's Division of Inland Fisheries, trout production and stocking is a combination of science and hands-on skill. Not incidentally, it also is remarkably efficient from a financial point of view. The agency, and the state of North Carolina, gets an incredible return on investment with trout.

This year the agency will stock 875,195 brook, rainbow and brown trout at a cost of about $1 million. Based on a recent economic survey, trout fishing boosts the economy of western North Carolina by $174 million annually. Fly shops, hotels, restaurants and gas stations all benefit, as do those people employed as a result of trout fishing. Of that total, $119.2 million is attributable to hatcheries. Spending $1 million to generate $119.2 million is quite a return. And most of that $1 million is funded by excise taxes on fishing gear distributed through the federal Sport Fish Restoration program.

The purpose of stocking all those trout is simple: They are to be caught. They are not intended to rebuild or establish populations of fish. In fact, in order to prevent hybridization with native Southern Appalachian brook trout, all the stocked trout are sterile.

Most of us, though, won't consider any of that on the traditional opening day of April 6. We'll think instead of lure selection and take heart in the joy of seeing a trout, whether hatchery or wild, swirling at our feet prior to release.



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WILDLIFE IN NORTH CAROLINA

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A Puzzling Decline

As a quail hunter since the mid-1950s, Mark Jones' article is by far the best I have read since the decline began! While I am not a biologist, I have to wonder if anyone at age 73 has spent more hours quail hunting. My father was a quail hunter and came along when everyone worked 5 1/2 days a week, so he could only hunt Saturday afternoon and a few days at Thanksgiving and Christmas. I kept time records one year in the '70s, and at the end of the season, he said he was sure I had hunted more that year than he had in his lifetime.

You pointed out as one problem "forests with heavy, almost impenetrable understories." Most of my hunting was in Durham, Chatham, and Warren counties. The first "cutover" I remember was around Inez and Ida in eastern Warren county. It was surrounded by soybeans and the quail numbers for two years were incredible. Thereafter, it got too thick to hunt, but cutovers started popping up everywhere. This was probably around the mid-70s. Several years ago, I was duck hunting in Warren and heard two different coveys come off the roost in a nearby 3-year-old cutover at first light. I could not wait to go back with my setters, but within 100 yards of entering the cutover, we were bleeding and it would have been impossible to shoulder the shotgun.

The dramatic quail decline for me began in '90 or '91, the last year I participated in providing records to N.C. Wildlife Resources Commission. I hunted coveys that no one else hunted, and all of a sudden, the quail stopped whistling when scattered, both at dark and the next morning. They were not shot out or overhunted. To this day, I can't figure that out. The deer were becoming plentiful in western Warren then, and I remember that years previously an old man in Ida had told me "once the deer become plentiful, your quail hunting will be over." He was right, and I still wonder why.

My favorite quail food to hunt over was Korean lespedeza because the birds would stick like glue. I would always broadcast it along edges, etc. in Feb. and where planted, it was a quail magnet. What has happened to it? I can't even find any, and it used to be plentiful. Have the deer eaten it all? What has happened to the wood thrush and the woodcock? For many years, I killed more woodcock by accident than I did quail on purpose.

My hunting now is preserve hunting where the end of my and my 11-year-old setter's quail hunting is at hand. I am so very thankful to have been lucky enough to enjoy the South's Once Greatest Hunting Tradition for so many years!

Fred L. Tyree
Chapel Hill

I was struck by the connection between clean farming and quail decline. It has been my observation that municipalities and parks and recreation departments have a misguided notion of neatness which causes them to Bush Hog and bulldoze parks and greenways in order to get rid of underbrush and make things look neat. This has turned many acres of old field and riverine forest into a barren wasteland. It reflects our lack of connection with the natural world and failure to understand the consequences of our actions. It detracts from the outdoor experience and confines wildlife to the edges where things are neglected.

To save the quail in North Carolina does not require a lot of money or research. It requires extensive education in the non-use of outdoor power equipment. Let brooks remain brushy and crooked. Leave beaver dams alone. Let the banks and edges grow up. And quail and other wildlife will come back. Nature, as a wildlife biologist told me some years ago, likes a mess.

Richard Lind
Asheville

Tribute to 75

The November-December issue was a fitting tribute to the 75th birthday of *Wildlife in North Carolina*. Although I am not a grouse hunter, I have encountered their explosive take-offs on more than one occasion on treks through mountain forests. Gerald Almy in his article on page 4 graphically recreated those scenes for me, and gave rise to respect for this noble bird and the hunter as well.

The article on the Biltmore Forestry School by David Lee at page 8 was an enlightening window into this discipline and school that have meant so much to the health of North Carolina's irreplaceable woodlands. Like many other readers, I am sure, I knew next to nothing about this school. Mr. Lee's grandfather's journals remind us yet again that accomplishment of any lofty goal often lies in focus and assiduous attention to nitty-gritty details. Many happy birthdays to come.

Jonathan Maxwell
Greensboro

Geographically Challenged

What a great magazine! I've been enjoying it for about 40 years. The photos in the Jan–Feb. 2012 issue were awesome.

It is extremely rare that I see an error. But there's one on page 43 in the sidebar about shad migration. Note the sentence " Eventually, they end up in Newfoundland's Bay of Fundy." Oops! The Bay of Fundy is between Nova Scotia and New Brunswick and a very long way from Newfoundland. Maybe nobody else noticed the error. One error in four decades of pretty close reading ain't bad. Keep up the good work!

Steve D. Austin
Lawndale

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Biologist Kin Hodges mans the net on an electrofishing trip in the western part of the state.

Fisheries biologists do sometimes fish for a living, but their methods are different and knowledge is their real catch.

TOOLS of the TRADE

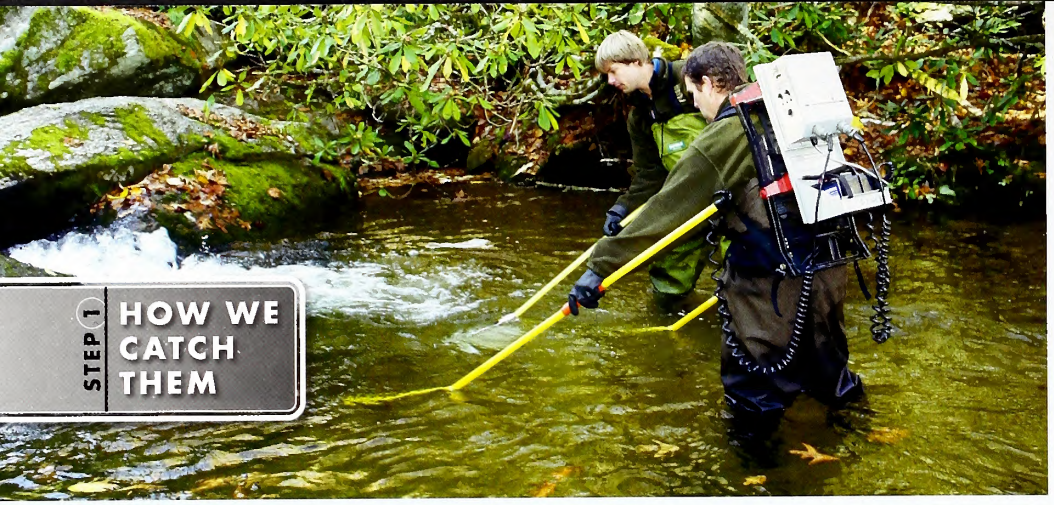
written by KEVIN HINING
photographed by MELISSA McGAW

AS IS THE CASE with most occupations, fish biologists are asked many questions. These questions often revolve around what can be done to improve fishing, when certain waters are to be stocked, and what the regulations are. However, one of the most common questions a fish biologist receives is "So, you get to fish for a living?" This question is tough to answer because while there may be only one definition for fishing, "the catching of fish for sport or for a living," there are many different ways to catch fish. Fish biologists use different types of tackle than most folks are used to. To many, these ways of capturing fish are foreign, and maybe even a bit strange.

There are several reasons why fish biologists need to collect fish. These reasons include:

1. determining what species live where,
2. documenting the presence of rare or endangered species,
3. investigating the abundance, growth, health and reproduction of a species,
4. evaluating fishery management plans and regulations, and
5. researching public health issues, such as mercury contamination.

Regardless of the purpose of sampling, catching fish is just one piece of the puzzle that a biologist must complete to manage fish populations. Once fish are caught, a variety of analyses are made to help determine how the population is doing. The final step is to incorporate angler expectations into the decision-making process. We'll start with the first step and work systematically through the others.



STEP 1 HOW WE CATCH THEM

Electrofishing Capturing fish with electricity (electrofishing) is one of the most common methods used by fish biologists for capturing fish in lakes, large rivers and streams. Electrofishers create an electrical field in the water that momentarily stuns fish, hopefully long enough so that they can be captured with a hand-held net. Fish that are captured by electrofishing usually recover in two to three minutes and can be released as soon as biological information is collected.

The electrofishing units are usually composed of three parts: (1) a gas generator or battery power supply, (2) a control box, which regulates current, voltage and amperage, and (3) probes, which allow the electrical field to flow from the power source to the water. While the basic idea is fairly simple, electrofishing units come in a wide variety of shapes and sizes, each with a specific type of waterbody in mind. Small backpack units allow fish biologists to hike into remote headwater streams to look for trout. Small jet boats and rafts equipped with electrofishing units allow the sampling of large streams and rocky, shallow rivers for smallmouth bass. Finally, large units on large boats are used to sample lake shorelines for largemouth bass or to sample coastal rivers for striped bass and shad.

Electrofishing works great for many fish species, but there are limitations. Different fish species respond differently to electrical current, so the settings used to collect largemouth bass will often not work for collecting many species of catfish. Also, the conductivity of water impacts the strength and ultimately the size of the electrical field. Conductivity is a measure of the ability of water to carry an electrical field, and it increases as the amount of dissolved ions in the water increases. As a result, electrofishing in waters with low conductivity such as pristine trout streams requires the probes to be within a couple of feet of the fish to be effective. Even in moderately conductive waters, fish often need to be within 5-10 feet of the probes. Water depth can also affect the number of fish collected. For this reason, lake samples are usually conducted at a time of year when the fish species of interest inhabit shallow, shoreline portions of a lake, such as in the case of largemouth bass in the spring.

It is important to note that electrofishing can be extremely dangerous, and people have been severely injured by improperly using electrofishers. They are also illegal for use by the public with the exception of hand-crank electrofishing units allowed under local laws for catching catfish in a few southeastern North Carolina streams.

Two other common methods used to collect fish are more in line with traditional fishing methods—the use of nets. Two types of nets that are routinely used to collect fish by biologists are the trapnet and the gill net. Both of these devices are considered passive gears, since they are usually deployed, left for a specific time period (usually 24 hours) and then checked for fish.

Trapnets Trapnets resemble a large box with a lead line extending from one end and a series of hoops coming off the other. The lead line is attached to the shoreline and floats vertically about 4 feet in the water column. This structure acts as a barrier so that fish swimming along the shore encounter the lead line and follow it into the box trap. Once in the box, fish are trapped and can only swim farther into the trapnet through a series of hoops, with the last hoop tied off. A weight is usually attached to this end to keep it on the bottom. Trapnets are commonly used to sample crappies from North Carolina lakes during the fall. At this time of year, crappies often congregate and cruise shallow waters near the shoreline. However, trapnets often catch a variety of other species including sunfish, catfish and occasionally bass. The main limitation of trapnets is that they are restricted to fish species that frequent the shoreline, and they often work poorly in lakes with steep banks, since fish will just swim over the lead line.

Gill nets Gill nets capture fish by entangling them in a single wall of interlaced strands of monofilament, resembling a chain link fence. The nets come in a variety of sizes and are often 100 feet or more in length and 8 to 10 feet in height. Gill nets have a weighted line on the bottom and a floating line on the top and are usually set near the bottom or suspended in the water column. Generally, the larger the spaces between the webbing (mesh size), the larger the fish the net will capture. Gill nets are primarily used to collect species that often cruise the open waters of a lake in search of forage, such as striped bass, walleye and blue catfish. When using gill nets, several different mesh sizes are often deployed so a variety of fish sizes, and hopefully a representative sample of what is in the lake, can be collected. The effectiveness of gill nets relies largely on setting the nets within the portion of the water column and region of the lake that the target species are using. Biologists identify and mark the location of trapnets and gill nets with buoys, which help prevent them from causing problems for boaters and anglers.

Commission biologists typically like to capture 200–300 fish for a stock assessment, and electrofishing, trapnets and gill nets allow biologists to capture these numbers in a reasonable amount of time. While each method has biases, collecting fish with standardized gear types and methods over several years allows biologists to monitor fish populations effectively. It is difficult, however, to make comparisons between gear or to the numbers and sizes of fish caught by anglers.

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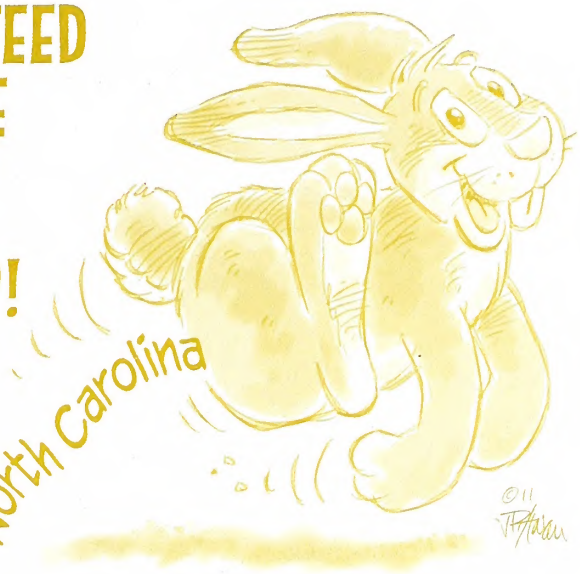

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STEP 2 WHAT DO WE DO WITH ALL OF THESE FISH?

Opposite page: Kevin Hining (foreground) and Joshua Hubbell man backpack electrofishing units, and Kin Hodges (below) works a trapnet. Jim Hollifield (far left) brings in fish for weighing and measuring. Sometimes otoliths (ear bones) (left) are removed from fish for study.

Once fish are captured, they are typically weighed and measured. We may collect data from all species, or focus on one variety, or "target" species. In many cases the fish are then released back into the water. However, in some instances, fish must be sacrificed to obtain additional information, such as age, critical to managing the population.

Index of abundance Since we have no way to capture all of the fish in a body of water, we have to use an index of abundance to give biologists an idea of the relative number of fish in the stream, river or lake. The number of individuals collected for the target species is compared over time, or to the length of area sampled, which provides us with an index of abundance commonly referred to as the "catch per unit effort." While this number is not an exact representation of the population size, it does allow the comparison of catch rates across several samples and several water bodies.

For trout, a biologist might compare the number collected for a 100-meter reach of stream (number of fish/100 meters), while the number collected against the amount of time spent electrofishing (number of fish/hour) is usually used for largemouth bass. For fish collected in trapnets or gill nets, the catch per unit effort is often referred to as the number of fish captured per "net-night." For example, if 10 trapnets or gill nets are set in a lake and checked every day from Monday to Friday, that would equal 10 nets X 4 nights for a total of 40 net nights. If a total of 100 crappie were captured over the course of 40 net nights, then that would equate to 100/40 = 2.5 crappie per net night. Data collected over the course of several years provide biologists with a relatively good indicator of fish abundance.

Length distribution The length of all the fish collected for a specific species is often displayed in a graph known as a length distribution. This graph shows what percentages of the population fall within specific length classes. From this information, the average fish length, as well as the range of fish lengths present, can be determined. Length distributions provide biologists with an indicator of growth rates as well as harvest of the fish.

Relative weight Normally, the weight of a fish is used in conjunction with its length to indicate overall health or condition. This index of health is commonly referred to as the relative weight. Relative weights can be compared among different ages of fish as well as between different water bodies. A fish population with a high relative weight often suggests adequate food sources, habitat and water quality.

Age and growth information Fish are aged by extracting and examining the ear bone. Like people, fish have three ear bones on each side of the head. In fish, these bones are called otoliths. The largest, or sagittal, otolith has tree-like rings that can be counted to determine the fishes' ages. Once fish are aged, biologists often create an age distribution graph. This provides information on the proportion of the fish population at a given age, and provides insight on reproductive success and mortality rates.

The age information, coupled with the fishes' lengths, provide "length at age" data that indicates how quickly fish are growing. Growth rates may suggest limitations, such as forage fish densities, inadequate habitat and poor water quality.

STEP 3

WHAT FISH BIOLOGISTS CAN DO TO MANAGE FISH POPULATIONS

The catch per unit effort, length distribution, relative weight, and age data provide important information used to determine management options. The management options a fish biologist can consider normally fall into one of three categories: regulations, habitat alterations and fish stockings.

Regulations There are four basic types of regulations that can be used to manage a fishery—(1) creel limits establish a maximum number of fish that may be harvested; (2) size limits set limitations on the length a fish must be in order to harvest it; (3) gear restrictions limit the type of tackle that may be used; and (4) seasons establish times of the year when anglers can harvest and/or fish for a particular species.

Habitat In streams and rivers, fish are often affected by increases in sediment and water temperature caused by the clearing of trees and shrubs along stream banks. Stream restoration projects focused on habitat improvements by planting vegetation along the stream banks will help alleviate sediment inputs and provide shading that can keep water temperatures cooler. As a result, fish reproduction and survival may improve, resulting in higher numbers of fish and hopefully older and larger individuals.

Biologists also create aquatic habitats to congregate fish in specific areas. Commission staff cut and cable trees along the shoreline and sink trees and other fish habitat structures in deeper water. While these habitat alterations may not necessarily increase the numbers of fish in a lake, they can help congregate fish in specific areas and increase angler success.

Stocking The stocking of fish for angling purposes falls into two main categories. Put-and-take stockings provide anglers immediate opportunities for catching fish. Trout stocked in Hatchery Supported trout waters and catfish stocked in waters managed as Community Fishing Program sites are good examples. In contrast, put-grow-take waters are often stocked with young, small fish with the intent of those fish growing to a larger size before being caught by anglers. Reservoir striped bass is a good example of a put-grow-take stocking program. Put-grow-take stocking is generally used when habitat conditions limit reproductive success of a fish population. However, the stocking of young, small fish can also be a tool to help replenish fish populations following large fish kills. Put-grow-take stocking is often more effective than producing larger, catchable fish since less time, food and hatchery space is required. Adequate habitat and food must be available for an extended period of time in these waters to allow stocked fish to reach harvestable size.

Fish are also stocked to provide forage for various game fish species, with the intent of improving their growth rates and sizes. Threadfin shad are the preferred forage fish for stocking in NC reservoirs, and provide a food source for a wide range of fish species, including crappie, walleye, largemouth bass, and striped bass. The offspring of stocked adult threadfin shad provide the primary forage benefit to game species. Threadfin shad are generally intolerant of cold water temperatures (less than 39° F), and must be restocked periodically to maintain populations in many North Carolina reservoirs. However, it has become exceedingly hard to obtain threadfin shad for stocking, since

Opposite page: Biologists create habitat (top) with the use of porcupine attractors. Gary Gouge (below) releases trout into a mountain stream. Above: Danny Meany (right) transfers a net of hatchery-raised trout for stocking.

many of our reservoirs that might serve as a source of threadfin shad have become contaminated with unwanted species such as blueback herring and/or alewife. Both blueback herring and alewife have been linked to declines in some gamefish populations and should not be introduced into reservoirs where they currently do not exist.

What fish biologists can't do While there are a number of things biologists can do, some issues are often beyond their control to alter.

Exotic and introduced fish species, such as flathead catfish and spotted bass, have caused declines in gamefish populations. Furthermore, fish that are highly prized in their native coastal areas, such as alewife, blueback herring and white perch, can cause huge problems in reservoirs. Problems from introduced species often occur because they compete for food and habitat, or because they are an additional predator in the system. While biologists can have impacts through regulations, habitat manipulations, and stocking, it is usually impossible to remove an exotic species once it is introduced. As a result, it is illegal for anyone to stock fish into a public waterbody without a permit issued from the N.C. Wildlife Resources Commission.

Fish diseases are also problematic. As with exotic fish species, once a fish disease enters a system, it is nearly impossible to manage. Luckily, while some disease outbreaks can cause serious problems to fish populations, many are a natural occurrence and run their course similar to how the flu or a cold works its way through the human population. One of the ways fish diseases are spread is through the stocking of diseased fish. To aid in the prevention of disease transmission to lakes and rivers, the fish stocked by the Wildlife Commission are routinely tested for a variety of viral and bacterial diseases.

Water quality is another factor that limits our ability to manage aquatic resources. Excessive nutrients can lead to algal blooms and problematic levels of aquatic vegetation. Bacterial decomposition of organic matter may deplete oxygen levels during the summertime and stress and kill fish. On the opposite side of the spectrum, low nutrient levels limit the productivity of aquatic systems. Waters of low productivity are not capable of producing large numbers of large fish, because the basic building blocks for fish growth are limited. For example, many of North Carolina's wild trout streams are not very good at producing large trout. A few of these streams are so pristine that they are practically devoid of nutrients, resulting in slow fish growth. Although the commission has no statutory authority over water quality in North Carolina, our biologists work very closely with the N.C. Division of Water Quality to protect the habitats of fish and other aquatic animals.

Fish are also stocked to provide forage for various game fish species, with the intent of improving their growth rates and sizes.

Summary While these examples are oversimplified, they provide some insight on how fish biologists catch fish and what they do with the information. In reality, the status of a fish species within a lake or river is driven by multiple factors, including water quality, weather, interactions with other species, land use and fishing. As a result, fisheries management is often complex. Fish biologists also include the desires and expectations of anglers and the public in decision making. Often this is done through angler opinion surveys (telephone as well as mail-in) and creel surveys,which involve face-to-face questions between commission personnel and anglers, often at boat ramps or other fishing access spots. The Wildlife Resources Commission also gives anglers and hunters the opportunity to comment on regulations and other issues at annual public hearings.

Finally, if you haven't been fishing in a while, give it a try. The N.C. Wildlife Resources Commission website at ncwildlife.org is a great place to find information on where and when to go fishing and to learn more about our freshwater fish species. You can also reach us by calling 919-707-0220. Or, if you are an avid angler, we hope you consider sharing your enthusiasm for the sport with others. While you might be giving up some of your hard-earned knowledge on places and ways to fish, you will definitely strengthen the persistence of your favorite past time by creating another advocate for sound fish management, public access for fishing and fish habitat protection. After all, catching fish is just one piece of the puzzle.

Kevin Hining is a fishery biologist for the Wildlife Resources Commission in District 7.

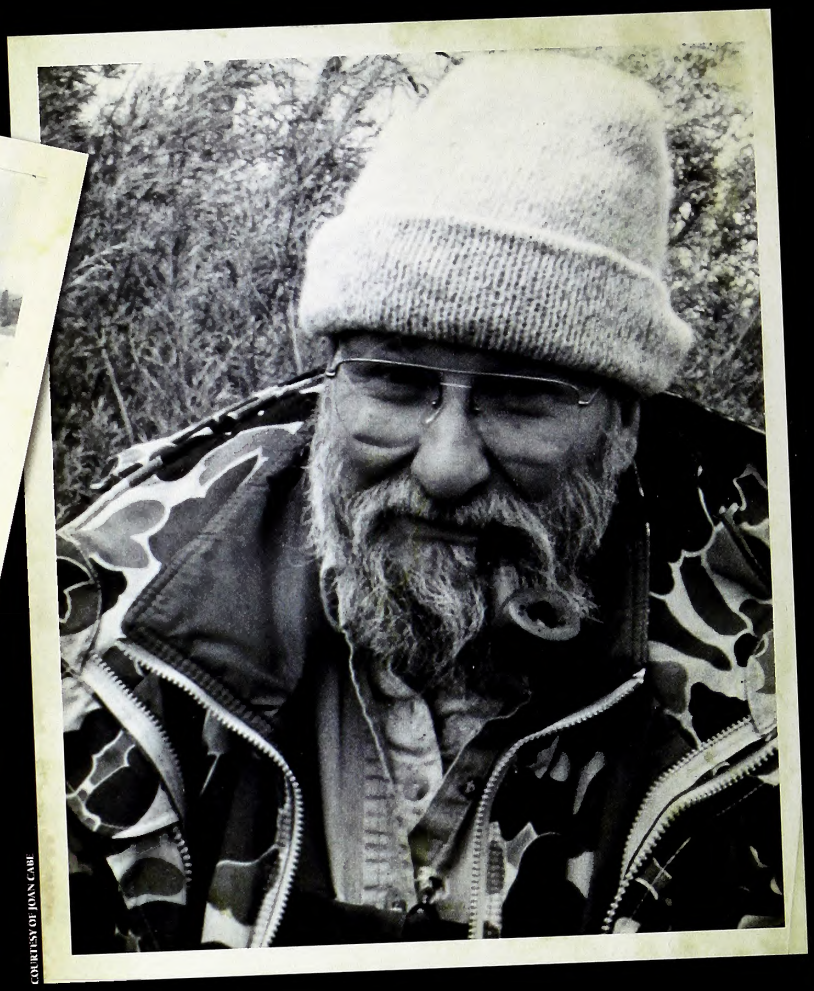
COURTESY OF JOAN GABEL

The Origins of a Trout Fly

Written by
Geoff Cantrell

Inspired by one man's experience and desire to land fish, the Jack Cabe Hopper ties together family memories.

COURTESY OF JOAN CABE



COURTESY OF JOAN CABE

Jack Cabe owned a popular fly shop in Highlands, Mainstream Outfitters, and named his new fly after the shop, calling it the Mainstream Hopper. Popularly, though, it's called the Jack Cabe.

It's mid-morning in September, crisp and increasingly bright; bright in the day, bright in hope and bright in ambition, with ambition today being relegated to the desire to catch trout and forget work and other obligations. The walk to the river through the abandoned pasture provokes dozens of grasshoppers into raspy arcs of drunken flight.

"A good sign," he says. He smiles as he bites into his pipe and a faint smoke ring of Sir Walter Raleigh rises between us. At arm's length away, the only response I am capable of is a soft "Oh yeah" and the crunch of dried grass under my feet. I am always a bit intimidated whenever I fly-fish with my father-in-law. While we both share a love of the outdoors, especially trout fishing, Jack C. Cabe, of Highlands, North Carolina, is passionate on a whole 'nother level and well known for his angling prowess. He owns a popular local shop, Mainstream Outfitters, not far from the center of town.

He is pretty much a legend already, at least in fly-fishing circles, which are the only ones that count. Plus, he has the bearing of the coach he once was. Even in this casual moment of camaraderie, I can almost feel that he expects the best performance one can deliver, the "one" in this case being me. Somewhere in my head, my inner dialogue suddenly has a gym echo to it, and the unspoken words say drills and practice are what produce results.

Lord, help me that I don't make a sloppy cast, get snagged or break-off.

"I think a hopper'll be productive today," he says, the smile never leaving his face. He is looking forward to today, though I can tell he is planning to be more of a guide than a fisherman on this trip. "And there are some real decent rainbows in there." The smile gets a little broader. He tosses a fly box to me. "For you" he says, as he resumes walking.

He has developed a terrestrial pattern he calls the "Mainstream Hopper" in recognition of his shop. It doesn't look like most grasshopper patterns I'm familiar with, like Dave's Hopper, the Letort Hopper or Joe's Hopper. It has a downwing, trude appearance, no rubber legs or spun deer-hair collar. The body is dubbed, not yarn or wrapped foam. It has tan calf tail for a wing, red floss for a tail, and the dubbed body is a rich, dark brown. The thorax is mixed grizzly and brown hackle. The box is filled with them.

Some say the fly is more of a stonefly than a terrestrial pattern, which is how Orvis will briefly market it a few years later. At competing fly shops and in catalogs, they have taken to

calling it the "Jack Cabe," in recognition of him. That moniker also avoids weighing in on whether it is a stonefly or grasshopper or an attractor.

He will never refer to the fly as anything other than the Mainstream Hopper, though a well-respected guide in Montana becomes insistent that it's a "Jack Cabe" and it catches on. A story circulates about a couple cowboys telling a well-heeled shopkeeper near Bozeman, or maybe it was Red Lodge, he was using the *wrong* name for that fly and he *would* correct it before another was sold. In a travel magazine article on craftsman-built Mackenzie drift boats plying the Middle Fork of the Salmon River, there's a single sentence about searching the fly box for "a Jack Cabe, a fly so deadly it can't be photographed, compared, or described in print." That is some nifty use of poetic license to make a fly seem exclusive, elusive and magical.

THE OBJECT OF FISHING IS TO CATCH FISH, WHICH THIS FLY DOES.

His many fishing trips to many different waters have led to each refinement, with the neighboring Cullasaja, Chattooga and Davidson rivers being the primary laboratories in North Carolina, along with the Stillwater and Yellowstone rivers in Montana. When cast on the water, the fly really does give me the impression of a grasshopper haplessly floating on the current. To a trout, I imagine it looks like an irresistible, gourmet meal. Flies are fur, feathers and fabric pulled together into functional form. Fly-tying is an art sometimes, a craft always. The alchemy here was creating something that works, namely, catches fish. Because no matter what you've heard and Thoreau to the contrary, the object of fishing is to catch fish, which this fly does.

It was on an earlier fishing trip to the West in 1987, I believe, that he stumbled across a local pattern that began the evolution of this fly. Although I think the real evolution could truly be traced to a young boy in Macon County, absorbing every bit of outdoors knowledge he could from his elders, spending every waking moment he could hunting and fishing, and listening and watching in the woods. As Mary Orvis Marbury noted on a particular regional pattern in her classic 1892 book "Favorite Flies and Their Histories," it is "a fly with a record and evolved by most careful study and experiment." That definitely applies here. The Jack Cabe has become its own distinct pattern, with the only remaining feature of that earlier fly being the basic configuration and that calf tail wing.

Upon reaching streamside, he motions for me to sit on a nearby rock while he stands, fly rod in his right hand and his left hand cradling his pipe. He stands that way, contemplative or inquisitive, meditative or inspective, for a while, and then he motions me forward and points with his rod tip to a riffle created by a deflective stone. I gently cast to the outer edge of the riffle, and the fly drifts only a few feet, when a rainbow strikes and I set the hook.

He laughs with self-satisfaction. It is indeed a decent rainbow. The trout leaps and splashes down, and I keep the line tight against a surge, deep and upstream, pulling at the rod. The reel sings. Work and the world with its many obligations have disappeared.

There will be other fishing trips with my father-in-law, but not as many as we wanted or expected. He has lymphoma, and the time we have to spend together is lessening.

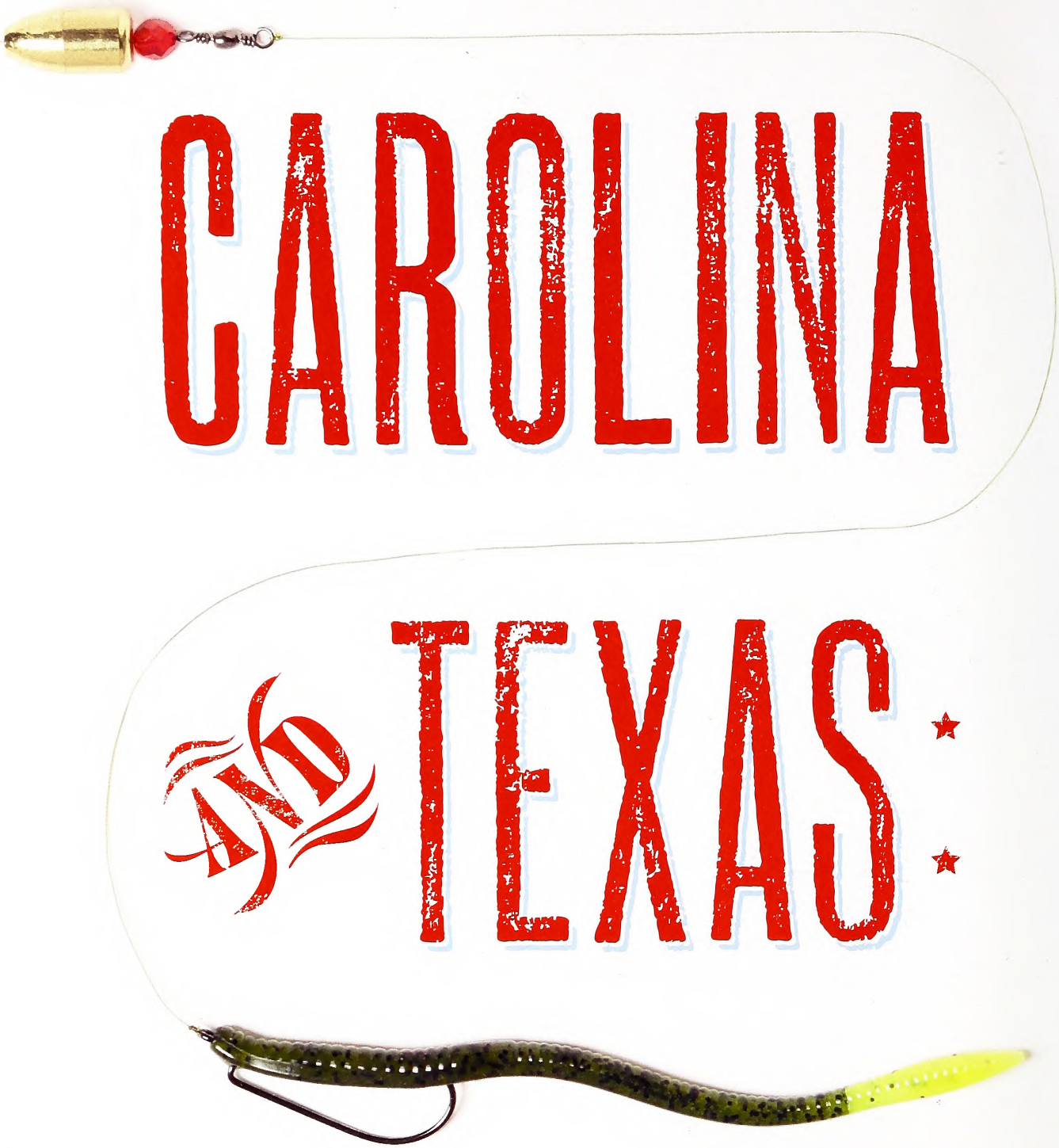
The rest of the morning and into the afternoon proved to be everything you could want in a fishing trip, and remains bright in my memory. I will deplete the box of flies in time, but I did embed the one that caught that rainbow, as a souvenir, into the visor of my truck, where it remains. In memoriam: Jack C. Cabe, Oct. 10, 1942–Jan. 7, 1997. ◆

Geoff Cantrell, originally from Balsam, is a public information officer with the N.C. Wildlife Resources Commission.

MELISSA McGAW / NCWRC

TYING THE JACK CABE

Hook: 2X long dry, 4-10
Thread: Black 6/0
Tail: Red floss or red calf tail
Body: Dark brown dubbing (aim for mahogany)
Wing: Tan calf tail
Hackle: Mixed brown and grizzly hackle



CAROLINA AND TEXAS

RIGS OF DISTINCTION

WRITTEN BY
MIKE ZLOTNICKI

PHOTOGRAPHED BY
MELISSA McGAW

CAROLINA AND TEXAS RIGS ARE ICONIC, EFFECTIVE AND BORN IN THE SOUTH

Texas and North Carolina have a few things in common in a distant sort of way. Texas is a football state, and North Carolina leans toward basketball. Texas has rodeo, North Carolina has NASCAR. They have Willie Nelson, we have James Taylor. They like beef brisket, we prefer pork barbecue.

The two state's monikers are associated with two of the most iconic soft-plastic rigs for bass fishing, but that has a slight twist as well. The Carolina rig was originally dubbed the South Carolina rig in the mid-'70s; see sidebar on page 18.

The Carolina rig and the Texas rig are two of the most popular techniques for largemouth bass. In a sport that is fraught with "the next big thing"—the shakey head jig, the chatterbait, and now the Alabama rig—the iconic Texas and Carolina rigs are mainstays.

Bass fishing—especially competitive bass fishing—seems to be a game of speed these days, with fast boats racing across reservoirs and anglers self-described as "run-and-gun" casting and cranking at a frenetic pace. If that's what you want to do, knock yourself out. I fish for relaxation as much as anything, so the Carolina and Texas rigs appeal to my slower pace. I also enjoy the "connection" the rigs allow

I DON'T CARE IF THE CAROLINA RIG HAS BEEN DUBBED THE "IDIOT RIG" AND THE "BALL AND CHAIN" FOR ITS SIMPLICITY. IT WORKS.

with the lake bottom. Maybe not Zen-like, but more ethereal than deep cranking. I don't care if the Carolina rig has been dubbed the "idiot rig" and the "ball and chain" for its simplicity. It works.

If memory serves, my first exposure to any rigged soft plastic bait was a Creme worm in my youth (I think it was the red beads and little propeller in front that got me). Then my late uncle Leon Lyczkowski of Raleigh showed me how to fish a Texas rig at Santee Cooper in the mid-'70s, instructing that the tell-tale "ka-thump" meant set the hook!

From there I learned more of the slip-sinker Texas rig, and for years a moccasin-colored Original Culprit worm with a 3/0 offset hook and a 3/8-ounce bullet weight was my favorite most of the time. Over the years I've had the opportunity to fish with some fantastic bass anglers (perk of the job), and two of them are Maynard Edwards of Lexington and Jeffrey Thomas of Broadway, both tournament veterans and guides. In this era of what's new, they both find time for these timeless rigs. In a very general sense, the Carolina rig is used more often in deeper water, and the Texas rig in shallower water. Depth is relative, but in North Carolina, anything more than 8 feet or so can be considered deep. The Carolina rig is more often a "search" technique, while the Texas rig is often used to target specific structure and cover.

"They're both a big part of my arsenal," said Edwards. "The Carolina rig revolutionized deep fishing. On High Rock, I'd often throw a crankbait to start and get the quick, easy bites, then follow with a C-rig to give them something else to look at and get some of the bigger bites. To get the follow-up, I'm bad to use 10- or 11-inch worms.

I did that when I had a limit or felt good about getting one."

When Edwards is guiding, especially with novice anglers, he downsizes some and often goes to a creature bait.

"I want to get that guy bit, and the creature bait has tentacles and stuff that creates more action, so the client doesn't have to do anything," said Edwards. "I use smaller hooks and a smaller bait. Bass tend to hit a smaller bait more."

For tournament fishing, Edwards resorted to the Carolina rig under certain conditions, such as "if you couldn't get a bite on anything else," he said. "It was painstaking. I used to get a headache doing it. Some days you have to fish it so dadgum slow."

On a seasonal note, Edwards said that for years he's fished a black trick ("floating") worm on a Carolina rig during the fall. "I don't know why a black worm, straight tail," he said. "I don't know why. If it ain't broke, I won't fix it."

Edwards' typical Carolina rig is a 16-pound test main line with a ¾-ounce bullet sinker and bead above a No. 7 swivel. He'll use about a 22-inch leader of 16-pound test mono with a 6/0 hook at the business end.

Edwards employs the Texas rig mostly for targeted structure—brush piles, docks and the like. Most of the time, he crawls it. "I don't fish it deep a lot, and I'll often flip it to cover," he said. "I heard a quote a few years ago that more money has been won using plastic worms than other bait."

Edwards uses the Texas rig more in the fall and spring, saving the Carolina rig mostly for post-spawn bass. He uses a 7-foot rod for leverage on the hook set.

"A great rod is key," he said, "especially for fishing deep. I use a 7-foot, medium-heavy Falcon. And don't go chintzy on your hooks. I like Gamakatsu."

Jeffrey Thomas, who guides Jordan, Falls and Harris mostly, often employs the Carolina rig as a search technique. "The Carolina rig is good for covering a lot of water because you can put a heavy weight on it," said Thomas, who has fished the national tournament circuits for 21 years. "The heavy weight gets it to the bottom quick and keeps it there. As a guide, I don't know what I'd do without the Carolina rig. I can cast it out, hand them [the client] the rod, and they make it work."

When the soft plastic Carolina and Texas rigs aren't working well, the spinner bait is always a good spring offering, as Jeffrey Thomas demonstrates.

Thomas typically fishes smaller baits on a Carolina rig, and usually in 10 feet of water or deeper. In the spring, he usually uses a 5-inch Deep Creek lizard. In the summer, he goes to a 10-inch Deep Creek Henry worm.

When fishing the Carolina rig, Thomas uses a 1-ounce bullet weight and drags the bait with a sweeping motion of the rod. Sweep left, retrieve line with reel, sweep right, retrieve line with reel,

always maintaining tension. The hook set is a combination of rod movement and reel cranking.

A typical Carolina rig set-up for Thomas is a baitcaster on a 7-foot medium-heavy Wright-McGill rod. The reel is spooled with 17-pound test Viscous monofilament. There's a ¾- to 1-ounce bullet weight ahead of the swivel. The leader is 12-pound mono tied to a TroKar wide-gap hook—3/0 for lizards and 4/0 or 5/0 for worms. Thomas will fish a straight worm like a Danny Joe Humprey floater in shallow water and in post-front conditions, but prefers a curl-tail worm in deeper water, presuming that the undulating tail helps the bass find the bait.

"I KEEP IT SIMPLE. A LOT OF IT IS CONFIDENCE."

His shallow-water Texas rig for casting to cover and flipping bushes is often a creature bait with a 5/16-ounce bullet weight (pegged) and a 3/0 TroKar flipping hook. For deeper fish (over 10 feet) it's a 10- to 11-inch worm and a ½- to ¾-ounce bullet weight.

"I keep it simple. A lot of it is confidence," he said. "I don't worry much about color. In clearer water, it's green pumpkin; darker water, Junebug. I'm not saying color doesn't matter, but in deeper water it matters less. Just keep it dark."

VARIATIONS ON THE THEMES

I fished as a press observer at the Bassmaster Classic in 1996. One day I was paired with David Fritts of Lexington, one of the best crankbait anglers ever. But the crankbait bite was tough, and toward the end of the day he pulled out a Carolina rig with a jig ahead of the swivel instead of a barrel or bullet weight. Why not have two lures instead of one?

Another time I was "fun fishing" with Rocky Mount pro Dustin Wilks in a backwoods farm pond in Halifax County. He was pitching a Texas-rigged tube bait, and I had my trusty Culprit worm. At the end of our trip, I had landed 12 nice bass. He had landed 48. It was like shooting "H-O-R-S-E" with Michael Jordan. He could fish that tube shallow or deep and was deadly accurate, while my flip-tail worm would splash about and sometimes wrap around shoreline cover. I've read where some anglers will put Alka-Seltzer pieces inside a tube bait hoping the bubbles attract attention. Plop, plop, fizz, fizz, indeed.

SOME THOUGHTS ON CAROLINA RIGS

Remember that the longer the leader, the harder it can be to detect a strike. A 2-foot leader means the bait can be anywhere within 2 feet of the weight: behind, ahead or beside it. But a longer leader can

cover more water, especially using straight-tail worms that dip and dart. The flip-tail worm and creature baits are more "straight line" due to the drag they cause, but that's better where stickups and brush can cause line wraps and such.

I almost always fish a Zoom or Danny Joe Original floater trick worm on a Carolina rig (confidence) and more variations with a Texas rig. If I had to choose my No. 1 confidence bait for shallow largemouth bass, it would be a 4-inch Zoom Junebug finesse worm with a 1/0 hook and a 1/8-ounce bullet weight. I've caught bass, crappie, catfish, bowfin, white perch and myself with that setup.

The Carolina and Texas rigs may not be as sexy as the latest "lure de jour," but beauty is as beauty does. Just remember, whether it's Texas or Carolina, low and slow is the way to go.

Mike Zlotnicki is the associate editor of Wildlife in North Carolina. *He may be contacted at mike.zlotnicki@ncwildlife.org or 919-707-0175.*

WHAT'S IN A NAME?

Information on the history of the Carolina and Texas rigs is tough to come by on the Internet, so I contacted Ken Duke, senior editor of publications at B.A.S.S., and he did not disappoint.

"As you know, bass fishing history is a bit sketchy at best—especially when you're talking about something as old and venerated as the Carolina and Texas rigs," Duke stated in an email.

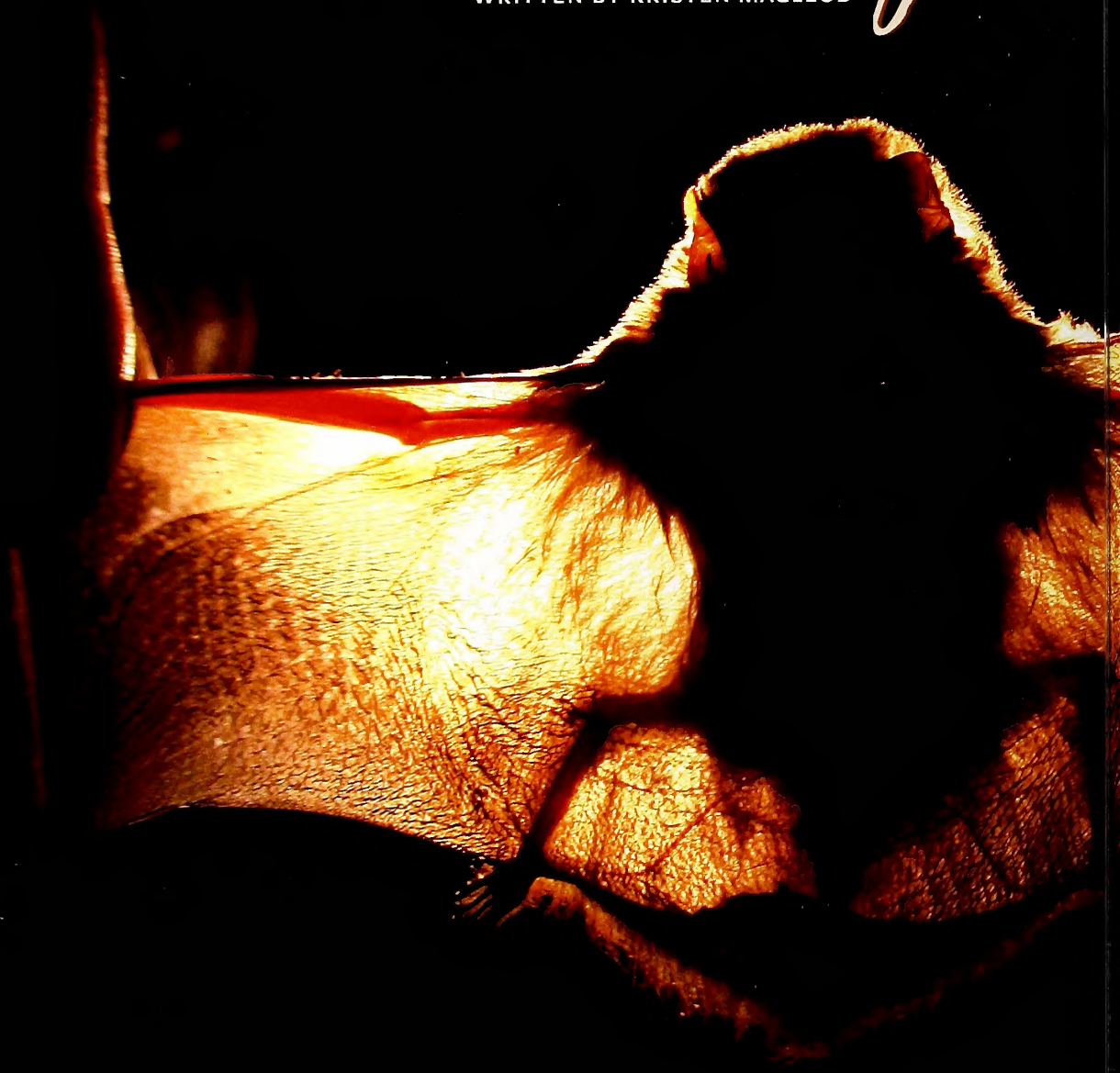
"I'll do my best to take them on in turn here. While a lot of folks might tell you that the Carolina rig came to prominence in 1985 when Jack Chancellor won the Bassmaster Classic using his Do Nothing worm, it was actually 1973 when it really came on the sport's horizon. That was when Bill Dance used it to finish second in the Classic on Clarks Hill Reservoir. The full name of the rig is/was the South Carolina rig, but I haven't heard anyone call it that in decades. Dance learned the technique from Georgian Junior Collis right before the '73 Classic, but it appears to have been around for some time before that."

While the Carolina rig is better documented, there is almost nothing out there on the Texas rig, so this next bit is probably news to most.

"The Texas rig is also shrouded in some mystery. Most early commentators and anglers agree that it originated in Oklahoma, perhaps by an unnamed Oklahoma fire fighter, for use in the brushy waters of Texas," stated Duke. "Until the 1970s, the rig was termed the 'slip sinker rig' more often than the 'Texas rig.' Longtime Texas bass guide Dave Hawk deserves considerable credit for spreading the word on the technique. Not only does he detail the rig in his 1970 book "100 Years on Bass," but he talks of cutting egg or pear-shaped sinkers to come up with early versions of worm slip sinkers."

SOMETHING Batty

WRITTEN BY KRISTEN MACLEOD



SEARCHING FOR ANSWERS TO WHITE-NOSE SYNDROME WITH BAT ACOUSTICS IN WESTERN NORTH CAROLINA

It is a wet August evening before sundown, and the rain puddles are large, dark and still as I drive along Swannanoa River Road. It isn't too long before the showers come down again. Driving westward, I keep going in and out of rain, but I'm headed straight toward one small patch of blue sky. I am meeting Cordie Diggins of the N.C. Wildlife Resources Commission for the first time in the Home Depot parking lot, just off I-40 in Candler. We are going on an acoustic bat route.

Diggins pulls up in a white Trailblazer with yellow state tags. She is a fresh-faced brunette in her late 20s with a slim build and deep blue eyes. She helped create the North Carolina Bat Acoustic Monitoring Program. The program is a collaborative affair among a number of organizations: the N.C. Wildlife Resources Commission's Wildlife Diversity Program, the U.S. Fish and Wildlife Service's Asheville Field Office, the U.S. Forest Service (Pisgah and Nantahala National Forests), the Eastern Band of the Cherokee Indians, and the Blue Ridge Parkway (National Park Service). The main goal of this program is to monitor changes in bat species' distribution and bat activity throughout the mountain region. This evening we will be taking one of 32 routes across western North Carolina to collect data.

Western North Carolina is home to 13 different bat species. Some of these bats are tree bats, migratory species known to roost in trees and leaf litter. The other variety is the cave bat, which spends winter hibernation in caves and old mines. It is the cave bat that is causing alarm in the scientific community, because many are afflicted with a mysterious ailment called white-nose syndrome.

Unlike species that hibernate communally in caves, eastern red bats (*Lasiurus borealis*), such as this individual being examined by a biologist, overwinter beneath leaf litter on the ground and are not susceptible to white-nose syndrome.

TODD FUSSER

RYAN VON LINDEN/USFWS

AL HICKS/USFWS

MELISSA McGAW/NCWRC

MELISSA McGAW/NCWRC

White-nose syndrome (WNS) was first discovered in the winter of 2006 in Howe's Cave near Albany, N.Y. It is named for the white fungus that grows on the muzzles, ears or wing membranes of the infected bats. Bats with WNS exhibit abnormal behavior during hibernation. For example, they may be seen flying during daytime hours in the winter when the temperatures are below freezing. The bats may also be found clustered close to the entrances of their hibernacula. Some bats are found emaciated and dehydrated; others are found with torn wing membranes. Still others have no recognizable signs, only that they are dead and white-nose positive.

It is unclear how or why this newly discovered fungus, *Geomyces destructans*, is attacking cave bats of various species. White-nose is spread through bat to bat transmissions during spring and fall swarming. It is also believed that humans may spread the disease by transporting fungal spores from infected sites to uninfected sites on clothing and caving gear. The U.S. Fish and Wildlife Service issued a voluntary moratorium on caving in white-nose positive states. When scientists and researchers enter caves, they wear fully protective white Tyvek suits. Afterward, they undergo an intense decontamination process.

"The solution is 10 percent Lysol or bleach, and we dunk our clothing, boots and other equipment for 10 minutes," Diggins says. This method has been tested in the lab to be certain the fungal spores will, in fact, be killed.

White-nose syndrome is caused by a fungus that actually grows on the living animal. The fungus hosts itself on the bats during hibernation, a time when the bats' body temperature and immune system are down, giving the fungus an advantageous period of time to grow. It is known that the fungus thrives in the cool, humid conditions characteristic of caves. It is also known that WNS has caused a bat holocaust of sorts: approximately 1.5 million bats have died in the Northeast alone in the last five years.

WNS is spreading and has been confirmed in 16 U.S. states: Connecticut, Indiana, Kentucky, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Tennessee, Vermont, Virginia, West Virginia, and now North Carolina. The fungus has

TODD PUSSER

confirmed in three additional states: Delaware, Missouri and Oklahoma.

In February 2011, WNS was found in a retired Avery County mine, then in a cave in Grandfather Mountain State Park, marking the arrival of the disease in North Carolina. In March 2011, biologists confirmed white-nose positive species in Yancey County. In April, Transylvania and McDowell counties were confirmed, and Buncombe County was listed as suspect, meaning the fungus was found on a bat, but it was not invading live tissue. The six mountain bats affected by WNS are the little brown bat, Eastern small-footed bat, Northern long-eared bat, tri-colored bat, the big brown bat, and Indiana bat, the last being a federally endangered species. The Northern long-eared bat and the Eastern small-footed bat are currently being considered for listing under the Endangered Species Act due to population declines from WNS.

Oddly, European bats have also been found WNS positive; however, they do not exhibit the same behavioral changes seen in bats from the United States, and there have been no recorded WNS-related deaths in Europe. It is hypothesized that these species potentially co-evolved with the fungus. This puzzling bit of information adds another cryptic clue to the mystery of where white-nose came from and how it got to the U.S.

"It has been estimated," Diggins says, "that the regional decline in the Northeast's cave bat population is 73 percent, a staggering number." She continues, "It has been predicted through population modeling that the little brown bat, one of the most common bats in the East, could be extinct from New England in 16 years. The rate that they are decreasing is unprecedented. White-nose syndrome is capable of wiping out more than just one species of bat."

Some people think of bats as flying rodents. This could not be further from the truth. Bats are actually more closely related to humans than rodents. Unlike rodents, bats are long-lived (some species in North Carolina can live up to 30 years). In China, the bat is a symbol of long life and good luck. Unlike rodents, bats are slow to reproduce, and they may only give birth to one pup a year, although some tree bat species birth twins. In late spring and early summer, female bats give birth and nurse their young. With the rate at which WNS is killing bats, it may take decades for populations to recover, if they can at all.

So why are bats important? All North Carolina bats are insectivores. They consume vast quantities of insects on a nightly basis. Many eat their weight in insect mass on any given summer evening.

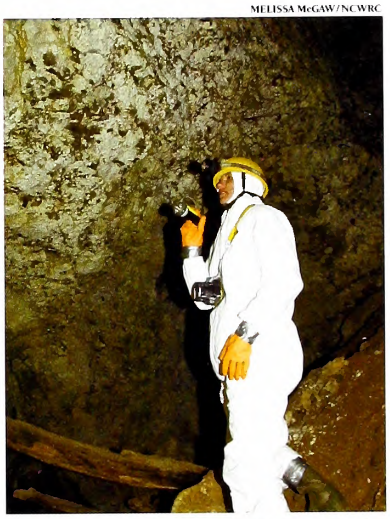
Diggins describes bats as a keystone species. "The keystone in an arch keeps the arch up, but remove the keystone and the arch collapses. Remove bats from an ecosystem, and the ecosystem may collapse."

It is clear that bat health is linked to human health. Bats provide global pest control, and, in the tropics, many are pollinators as well. Bats are helpers to agriculture and the forests through their natural and effective pest elimination. Without the aid of numerous bats, what might humans turn to? Pesticides—and Rachel Carson already proved many years ago in her book "Silent Spring" that this method is not advantageous to anyone or anything.

As the day's light fades, we drive into Pisgah National Forest. As we wind along the Davidson River, the trees grow shadowy and the light grows dim. We park near a group campsite, and the rush of water fills my ears. We exit the car and look up. Bats! There they are, swooping and diving, little, dark, shadowy figures in an evening sky.

(Top left) This bat has a case of white-nose syndrome. (Top right) Bats that hibernate communally, such as these big brown bats, are most susceptible to the fungal infection. Personnel from the Wildlife Commission and USFW collaborate on a winter survey of hibernating bats in Haywood County in western North Carolina.

MELISSA McGAW/NCWRC



MELISSA McGAW/NCWRC

TODD PUSSER

"The winters are milder. There is potential that white-nose syndrome won't produce the effects it has produced up North, but at this point it is all speculation. We have to wait and see."

MELISSA McGAW / NCWRC

An eastern red bat (*Lasiurus borealis*) forages over a Piedmont forest near dusk. It has been estimated that individual bats can consume over 1,000 mosquitoes per hour. (Bottom) These little brown bats (*Myotis lucifugus*) are shown hibernating together in a Haywood County cave. (Right) This tri-colored bat (*Pipistrellus subflavus*) is shown hibernating in a cave.

"Pips," Diggins says, a colloquial term for the goblin-faced tri-colored bats. "They're one of the first bats to come out at night, and they have that fluttery flight pattern." We watch them for a moment's time, even spying a large dragonfly in the mix.

"Better watch out!" Diggins says of the unassuming dragonfly.

In the trunk of the vehicle, she has what one might expect a wildlife technician to have for entering the field: a canvas hat, rubber boots and a large plastic tote labeled "Anabat," containing all the trinkets necessary for tonight's data collection. The Anabat is the sound device that will enable us to hear the bats, which are usually inaudible to the human ear. It is a handheld device about the size of a large flask of whiskey. Diggins turns the device on, and at first all we pick up is the piercing din of the evening's insect activity. Then we hear an almost sweet, chirruping sound.

"A bat," Diggins says, holding the device skyward. Bats use echolocation for commuting purposes, such as travelling from their day roost to their foraging site. Echolocation is also used for foraging. In simplest terms, echolocation is based on sound; bats emit sounds that strike objects and come back as echoes. A bat can interpret these echoes to tell what the object is, where it is located and how fast it is moving. Foraging is precisely what the skilled aerialists are doing as we watch them fly in the receding light.

"So we will be able to tell what a bat is doing by the sounds produced on the Anabat?" I ask.

"We will definitely be able to say 'OK, that guy just got a bug,'" Diggins answers. "We will also be able to tell the search phase, the approach phase—when they zero in on something—and then the terminal phase, or feeding buzz. It sounds like a zipper being zipped up really quickly."

I help Diggins place a car mount for the ultrasonic microphone on top of the vehicle. It is something she constructed herself—a wooden frame with a piece of PVC to place the microphone in.

"I like to believe I have some carpentry skills," she says modestly.

We secure the car mount to the roof with a thick nylon cord. We hook the microphone to the Anabat, then hook the Anabat to her computer, which has a program called Ana-Look installed on it. Using her laptop, we will be able to view an ever-changing sonogram of black dots and lines that will record the

frequencies in kilohertz made by the foraging bats. Diggins fills out a data sheet — date (8/12/11), time (9:06pm), temperature (72 degrees), cloud cover (100 percent) and moon visibility (completely obscured). I am given the task of holding the laptop, and we set out on the route called "Balsam Mountains." All bat routes begin half an hour after sundown and are driven at 20 miles per hour. We begin on a slightly washed out dirt road with our high beams on, flashers flashing and additional reflectors affixed to the rear of the car.

"When we get to the [Blue Ridge] Parkway this pace is going to feel like we're creeping, but back here it is going to feel like we're going really fast," Diggins says.

In the forest, the insect noise is still high, and we turn the volume down on the Anabat for our own sanity. However, bat activity is apparent: the lines on the computer spike with each tweet and chirp. Bats occasionally swoop into the car's headlights, giving us a quick glimpse of the creatures we are here to monitor. Up on the Parkway, the route continues, straddling Jackson and Haywood counties. In the spruce forest, the insect noise is almost nonexistent. The bat radar is now a peaceful crackle. We end our route exactly one hour after we started. It is 60 degrees, the coolest weather I've felt in a while, and the clouds have drawn back to reveal an almost-full moon. We pull off at an overlook to disengage the equipment. The fog is rolling along the road in low, soft billows. Diggins takes the laptop and scrolls back through some of the frequencies.

"Some good bat activity," she says. She peers at a series of small marks resembling a backward "J." "Probably a tri-colored."

After a few more minutes of reviewing, she closes the computer, with the files from tonight's data collection saved to the bat library for future use and further analysis.

What does WNS mean for western North Carolina? Again, no one really knows.

"Here," Diggins says, "the winters are milder. There is potential that white-nose syndrome won't produce the effects it has produced up North, but at this point it is all speculation. We have to wait and see. All we can do right now is monitor our bats and make sure we are not spreading white-nose to other sites." ◆

Kristen MacLeod is an Asheville writer. This is her first story for Wildlife in North Carolina.

FOR MORE INFORMATION ON HOW YOU CAN HELP RESEARCHERS LEARN MORE ABOUT BATS AND WHITE-NOSE SYNDROME VISIT NCWILDLIFE.ORG. OR DONATE ONLINE AT NCWILDLIFE.ORG/GIVE.

MELISSA McGRW / NCWRC

A portable blind allows a turkey hunter protection from the elements as well as seclusion and some freedom of movement, which aids the fidgety hunter.

MELISSA McGAW / NCWRC

Successful Turkey Hunters Rely on

BLIND LUCK

Portable blinds are here to stay, and offer seclusion and comfort for tom chasers

written by Mike Marsh

When it comes to success in hunting, nothing beats a heavy dose of good old-fashioned luck. While today's turkey hunters have better equipment in the way of tight-patterning, camouflage-finished shotguns, super-efficient ammo and easy-to-use turkey calls than the hunters of even a generation removed, there is one piece of gear that can bring more good fortune than any other, and that is the modern turkey blind.

My first experience with hunting a gobbler from a blind took place with my longtime hunting companion, David Franklin. Actually, Franklin, of Carolina Beach, was the only hunter inside the blind, which was a wooden packing crate that once held a half-ton of culled sweet potatoes for feeding deer. Since there wasn't room for two hunters inside the crate, I called to the gobbler from outside the blind.

The gobbler responded very vocally and approached our position quite willingly, but suddenly fell silent. After an extended waiting period, we checked out the gobbler's tracks in the sandy soil of Pender County. The tracks revealed that he had walked right up to the blind, then hot-footed away, most likely because he spotted me lying down in the shadow of the blind on the opposite side once he was close enough to peer around the blind. With Franklin's vision limited by the blind's lack of shooting ports, he had not seen the bird strut to within just a few feet of his waiting gun barrel.

A couple of years later, in 2007, a different drama played out. This time, Franklin was the caller, I was the designated shooter, and we were both inside a doghouse-style turkey blind. Several gobblers were answering his calls and had been moving slowly in our direction.

"They roosted in the trees overlooking another field," he said. "They are making their way through a swamp and will get to us sooner or later."

We were hidden inside a commercially manufactured turkey blind that consisted of fabric covering a quick set-up frame. It might have looked like a camping tent except that the outside of the fabric was imprinted with a camouflage pattern complete with die-cut fabric "leaves" and the inside was treated with a black coating that made the interior as dark as a starless night.

While the gobbling began at dawn, the flock of jakes making most of the commotion did not come into view for hours. The centerpiece of their strutting and gobbling was a hen that eventually led her entourage along a sandy road. Franklin had planted the road shoulders with chufa, a well-known turkey attractant. The blind was placed at the peak of a hill along the roadside, and the turkeys were scratching up the chufa tubers 200 yards away.

The hen walked toward the blind, digging for chufa all the while, as the other turkeys followed. Big Boy, who had been strutting along behind the turkey flock, finally emerged from the heavy cover. The jakes demurred as he became first in line behind the hen. When I finally took the shot, the gobbler hit the ground just 20 yards away

"I didn't think you were ever going to shoot," Franklin said. "How do you like hunting from a blind? It's pretty exciting, isn't it?"

Checking the time, I saw that it was 10:30 a.m. I thought back through decades of turkey hunting, and counted dozens of times when such a blind would have brought me better luck, for no other reason than just allowing me to sit still for that long. We had been speaking, drinking water, answering "nature's call," and sitting comfortably on folding camp chairs all that time. Franklin had been working a box call and slate friction call without fear of a turkey seeing his hand movements, and we didn't even have to hide our faces.

behind camouflage head nets. Needless to say, I was convinced at that moment that blinds have their place in turkey hunting. That statement means a lot, coming from one who had always been a dyed-in-the-wool, run-and-gun turkey hunter.

The list of advantages of hunting from a modern, commercially manufactured turkey blind is so great that it is now difficult for me to imagine hunting without one. My days-per-gobbler-harvested ratio has declined by at least half since I began using blinds. Blinds continue to advance in design and material composition, so a hunter will always be able to find a style to suit his hunting. A quick count of the "blind pile" in my garage shows a dozen turkey blinds.

There are many examples in which a blind can help turn the odds in a hunter's favor. Being able to hide from multiple sets of eyes of hens and jakes until a gobbler arrives in shotgun range, such as during my hunt with Franklin, is one example. I've also had gobblers come to my calling silently, without allowing me to adjust my gun positioning to properly greet their arrival. Without a blind, there was no hope for a shot. But from a blind, I've been able to bring many silent toms to bag.

While youthful hunters in top physical condition can sit for a long spell, waiting for a turkey to walk into gun range in response to a call, my wife, Carol, no longer has that luxury. A veteran hunter, she has spinal problems that prevent her from sitting long in the classic hunting position with her back against a tree. Before the season opens, we place blinds near roosts and beside fields where she is confident turkeys will make a showing.

"I can sit in a plastic patio chair with arm rests until at least noon," she said. "I can work my box calls and slates and watch a gobbler approaching from a long way off. The chair allows me to keep changing positions to prevent my back from hurting. For me, hunting from a blind has made a world of difference in being able to keep hunting turkeys with a good chance for success."

That's not to say a hunt from a blind is always perfect. Last year, on opening day, a big gobbler strutted for a hen not 20 yards away from her blind.

"I was raising my gun and the barrel hit the zipper on the flap of the blind window," she said. "The gobbler heard it and ducked his head just as I was getting ready to shoot. He launched in an instant and flew away."

That experience goes to show that, as with any piece of equipment, it pays to practice. The hunter should set up the blind and get seated inside, then try raising his gun as though preparing to shoot. Having enough room in a blind to raise the gun without interference from elastic cords, zippers and flaps is paramount. Familiarity with the entrance opening is equally important for crawling into a blind in the dark, when silence is golden and no lights can be used if a gobbler is at roost a few yards away.

Another advantage of a blind is that it can be set up where there is no cover and are no big trees to sit back against. Open fields or savannahs that are subject to controlled burns, where turkeys love to spend the day, can be impossible to hunt successfully without having a blind.

Conversely, extremely dense cover, such as a coastal swamp covered with palmettos and cypress knees, is another good place for a blind, because sitting on a stool or chair allows a higher perspective than sitting on an inch-high seat pad.

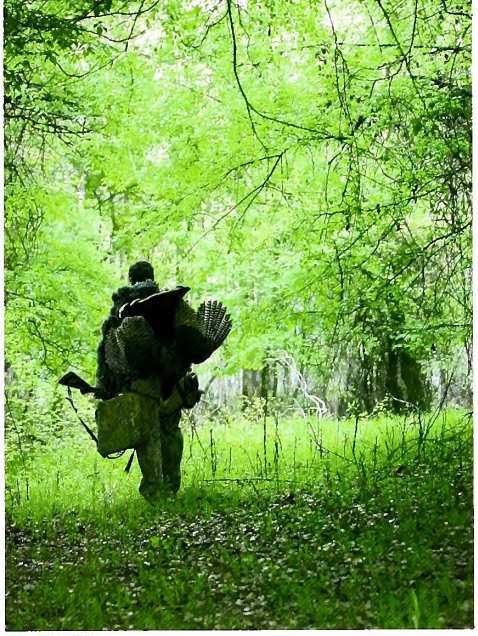
"Being able to sit high enough to see a gobbler approaching through a broom sedge field, swamp or thicket is probably the most important aspect of using a blind for me," Franklin said. "You can see a gobbler coming from a long way off and turn to face him as he comes into range without him being able to spot you. Also, if you are hunting with a bow, a blind allows you to kneel or crouch and draw the bow without being seen."

Protection from the weather is another plus for blinds. When North Carolina still had a winter turkey season, Franklin and I participated in a winter permit turkey hunt at Hyco Game Land when it was cold, windy and drizzling freezing rain. That experience had me better prepared for a hunt this past spring when the temperature dropped into the 30s and I was a long way from home, in Orangeburg County, S.C., without the benefit of a closet full of winter clothing from which to choose. I set up a waterproof, windproof blind and burned a container of solidified alcohol used to warm food that I had acquired from a sympathetic restaurant

RALPH HENSLEY

RALPH HENSLEY

CHIP LAUGHTON



CHIP LAUGHTON

Unlike deer, turkeys seldom pay much attention to a newly erected blind. Most blinds come with carrying cases, allowing the hunter to concentrate on his gun and the bird.

attendant at dinner the evening before. While everyone else in my party gave up hunting because of the cold and wet conditions, the warmth and dryness inside the blind kept me cozy until noon.

On another hunt, the weather was so hot there seemed no relief from the sun's brutality. But Franklin set up his blind in a shady location. Once inside, he removed his face net, cap and shirt, then zipped open the windows to let the air circulate. We drank bottles of chilled water to stay cool.

"A turkey can't see you inside a blind," he said. "A turkey's vision stops at the opening unless you open two sides and then he can see your silhouette. If he can see all the way through, you have to be cautious with your movements."

Looking at a turkey blind set up in the woods brings about a revelation. A zipped-open blind window appears to be just one more dark shadow or hollow in a tree trunk. The blind all but disappears. The only Achilles' heel of a gobbler's otherwise extraordinary vision is that he cannot focus on anything hidden inside that shadow.

Blinds are perfect for a companionship hunt, such as hunting with a child or spouse, or for teaching a new hunter the art of calling. They also enhance video and still photography opportunities that would otherwise be impossible to execute.

Although most blinds fall into the one-man or two-man category, some blinds are so expansive that several hunters can spend the night inside them to be near a gobbler's roosting tree come daylight. Others are so lightweight and portable the hunter almost forgets he is carrying a blind, until he needs it.

BLIND Favorites

- Field & Stream Ultimate Ground Blind
- Gorilla Gear Adjustable Height Blind
- Gorilla Gear telescoping blind
- Primos Ground Max Escape blind
- Primos Ground Max Scout
- Ameristep Doghouse blinds

I have favorites at each end of this spectrum and everywhere in between. The largest is a Field and Stream Ultimate Ground Blind. This blind is nearly 6 feet high and 54 inches square and allowed me to actually stand up to take a gobbler sticking his head above some briars as he approached my calls during the 2011 season. I took another gobbler in 2011 from behind a Gorilla Gear Adjustable Height Ground Blind that has four die-cut fabric panels with support poles that telescope from 25 inches to 40 inches high. The blind doesn't have a top. But from where I was sitting, in a hardwood bottom without any cover except scattered, mature trees, it hid me from three gobblers that approached on the run after I made a single series of hen yelps with a box call. The blind allowed me to turn slightly to shoot the first gobbler in line. I was so well hidden that the other gobblers did not leave until I stood up to collect another beard and long set of spurs, courtesy of a turkey blind.

The Gorilla Gear telescoping blind comes in several camouflage patterns and fits crosswise through the game pouch openings of my turkey-hunting vest. A string tied around the ends of the blind also allows me the option of shouldering it on the opposite side from my shotgun.

I have a Primos Ground Max Escape blind that offers exceptional protection from wet weather and wind. For long treks, I have a Ground Max Scout that consists of a folding chair with an integral blind of fabric on a series of metal hoops that flips over the seat to cover the hunter as he sits in the chair. My blind pile also includes Doghouse blinds by Ameristep and other manufacturers that fold into neat, circular packages once the method of folding has been mastered through a bit of practice. The lightweight doghouse blinds set up in an instant from their backpack coverings.

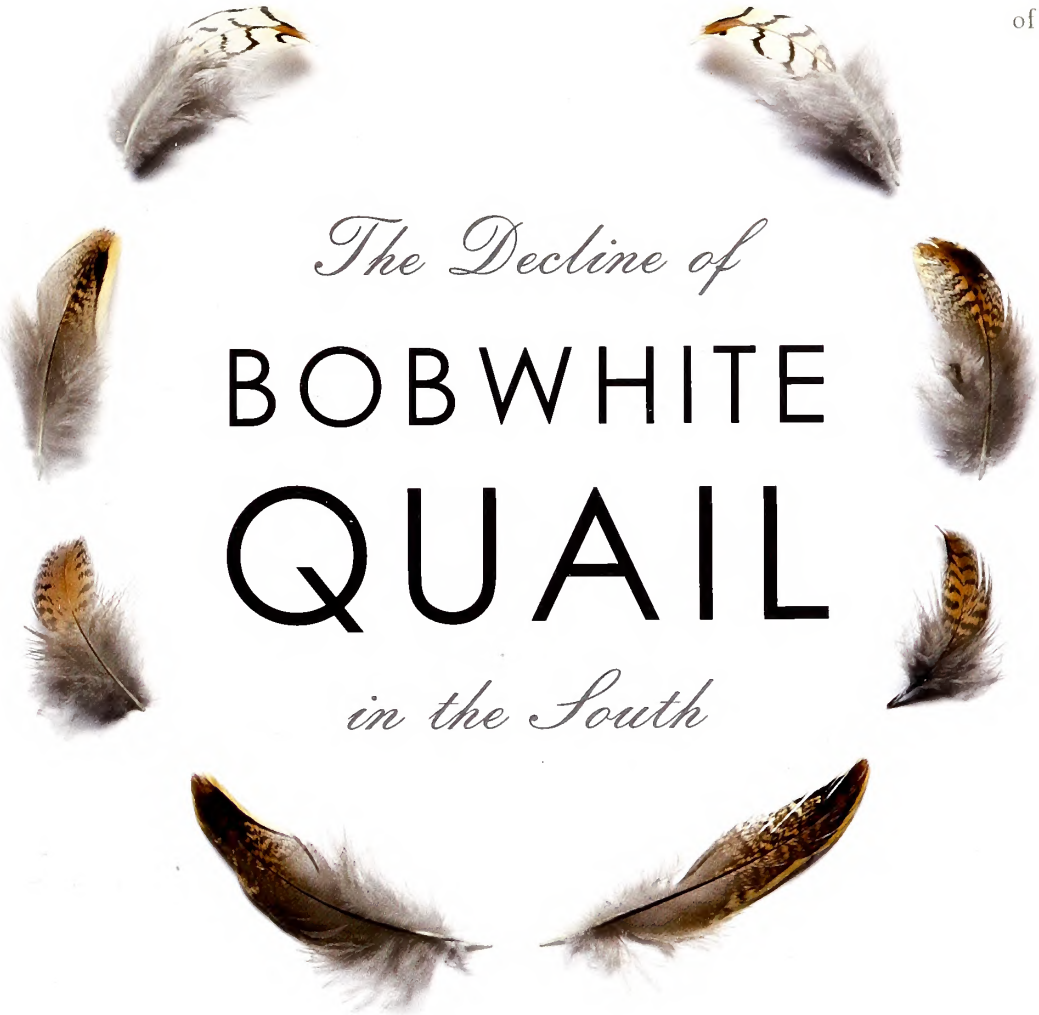
The cost of these blinds ranges from about $240 for the Primos Ground Max Ultra tent blind to $60 for the doghouse styles, on down to about $20 for the Gorilla Gear telescoping blind. The best time to buy blinds is after the season goes out, when they are placed on sale at sporting goods outlets or online or catalog retailers.

While a chair blind like the Primos Ground Max Scout is an exception, when using blinds, lots of consideration must be given to hunter seating. If portability is the priority concern, a lightweight folding campstool, with or without a backrest, will suffice. But for the hunter who wants the most in comfort or who will be leaving his blind in the same location for the entire season, a higher-quality folding chair or a hard-backed patio chair is a better bet.

Over the seasons since Franklin introduced me to hunting from modern turkey blinds, I have taken home far more gobblers while hunting from a blind than not across several states. While I might need to use a blind, I also might not, after taking into consideration the circumstances of a particular hunt. But with so many styles to choose from, I never leave home without at least having a telescoping turkey blind in my vest and a tent-style blind in the bed of the pickup. When people ask why I've become more successful at consistently bringing home gobblers, I tell them with a straight face that it's only "blind luck."

Wilmington writer Mike Marsh is a frequent contributor to Wildlife in North Carolina.

PART 2
of a Two-Part Article



The Decline of BOBWHITE QUAIL in the South

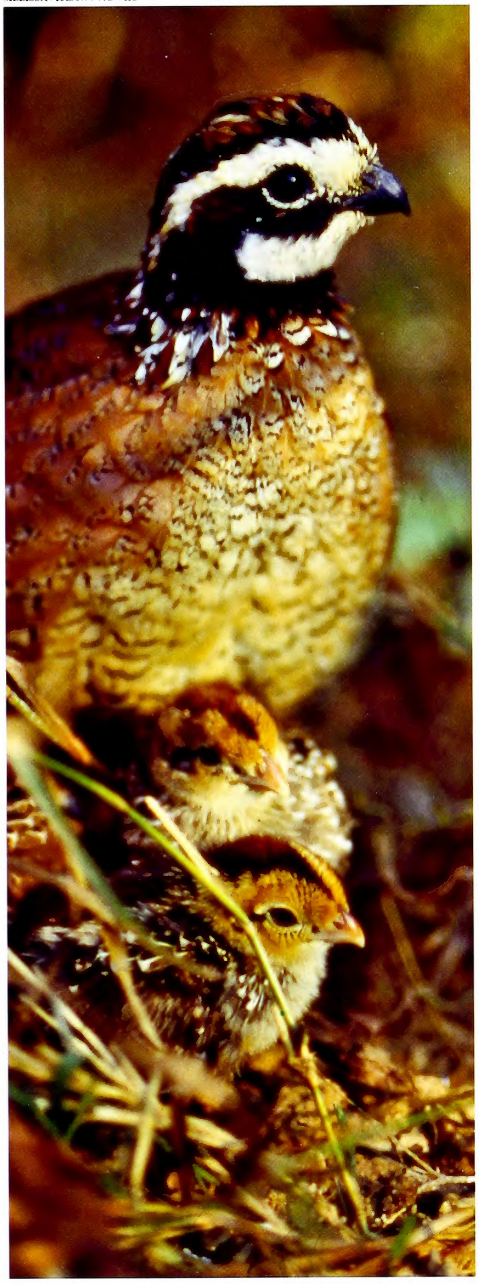
BIG PROBLEMS DON'T COME WITH EASY ANSWERS.

Written by Mark D. Jones

In the January/February issue, we discussed factors behind the decline of the bobwhite quail. It's well established that the problem is widespread throughout the range of bobwhites and does not come with easy solutions. In fact, the required habitat changes are expensive, time consuming, and difficult for the average hunter or even state wildlife agency to influence because of the need to impact huge acreages of mostly privately owned lands. The difficulty of impacting enough habitat to make a difference leads hunters to propose a variety of other solutions to the quail decline. Let's discuss a few one by one.

Many of our state's hunters suggest we stock quail, similar to the traditions for fish such as trout. While this could provide a reliable supply of huntable birds for a short period each season, in my opinion it would be a poor substitute for wild birds. Anyone who has ever witnessed a covey of wild bobwhite quail explode from in front of a bird dog will understand this sentiment. I'll let others debate the merits of

MELISSA McGAW / NCWRC



Bobwhites are very specific in their habitat requirements, and that habitat has been dwindling for decades.

N.C. STATE ARCHIVES

stocking birds for providing short-term hunting opportunities, but if folks think stocking will help our wild quail situation, dozens of experiences from around the country tell a different tale. This is hard for hunters to accept, because they often assume quail can be stocked just like wild turkeys, but the circumstances around the decline of the two species are much different. Understanding the differences is critical to making sure hunters and agencies make informed decisions.

Turkeys began declining over 100 years ago because their habitat was drastically degraded and because of excessive mortality as humans over-exploited them for food. However, turkey habitat began improving over much of the second half of the 1900s as forests recovered and the creation of state wildlife management agencies in the early and middle 1900s brought wise regulation of hunting seasons. A perfect storm of improving habitat and regulatory management allowed the highly adaptable turkey to be restored to improving but unoccupied habitats across the United States.

The three keys to this successful turkey story were the recovery of habitats occurring in the late 1900s, an ability to manage mortality levels through regulatory measures by state wildlife agencies, and the adaptable nature of the turkey itself. Under this scenario, it made perfect sense to move turkeys into quality habitats without birds.

The quail story does not qualify on any of these key points. Today, quail habitats continue to decline in both quality and quantity over most of the bird's range, with no sign of recovery. Bobwhites experience very high natural mortality, making them difficult to impact with regulatory measures like hunting seasons, and quail are specialists (unlike wild turkeys), requiring very specific habitats in order to reproduce and live out their daily lives.

Quail stocking has been attempted by many state agencies and private individuals with almost no success at establishing breeding populations in marginal habitats. The vast majority of wildlife biologists agree that stocking programs are a waste of resources and that our efforts are better spent working to improve habitat for existing birds. Populations in these areas are often low simply because the amount of quality habitat is very limited on our modern landscape.

Populations of quail are widespread across the Coastal Plain and found in scattered habitats of the Piedmont. Mountain quail populations are even more disjunct due to very limited quality habitats. Without improving habitat conditions, there is little hope for stocking birds into any of these regions. Quail are a species capable of reproducing quickly when their habitat needs are met, but moving birds into inhospitable landscapes would be like dumping fish that need fast-moving, cold, clear water into a coastal swamp and expecting them to live in a sluggish, warm and muddy stream. Our best bet is to manage habitats and allow existing birds to move into and inhabit quality habitat areas.

An example from a neighboring state illustrates this point. Wild quail were thought to be locally extinct in a county far on the periphery of this state's known modern-day quail range. In recent years, major changes to cattle grazing practices occurred in this county as aging farmers reduced herd sizes

WE KNOW *of* NO AREAS *of* GOOD QUAIL HABITAT *in* NORTH

due to multiple market forces. Then along came *Miscanthus* (Japanese silver grass), an aggressive species of non-native, introduced grass. This grass forced the next major land management change—the use of prescribed fire and flash grazing to control the spread of this invasive plant. All of a sudden, wild bobwhites were found in the areas formerly thought completely devoid of quail. Our neighbors report that it has been remarkable to watch quail populations increase in some of these areas when habitat improvements occurred. No quail were stocked; existing birds simply responded to newly available habitat.

Another solution we commonly hear is that we need to kill predators. The decline of the U.S. fur market, and subsequent decline in trapper numbers and interest, has played a role in increased populations of mammalian predators such as raccoons, opossums and foxes in recent decades. The ban on DDT, coupled with laws to protect hawks and owls, has increased populations of these birds of prey. There is no doubt that there are more species of many predators today than in decades past when quail were more abundant.

Because of legal status, we have to treat mammals and hawks separately when addressing any impact they may have on other wildlife. State wildlife agencies have full legal authority over resident mammal species and can pass laws and regulations to increase harvest or allow removal. Before this is allowed, it is important to know if mammalian predators can be linked directly to the quail decline.

In order to shed light on this issue, the N.C. Wildlife Resources Commission worked with researchers from N.C. State University and the Virginia Department of Game and Inland Fisheries on a comprehensive, long-term research project in the 1990s to test the removal of nest predators, including gray and red foxes, opossums, raccoons and skunks (all species that eat eggs and kill chicks). The results from this four-year effort told us that the control of these predators will not increase quail populations without the addition of significant acreages of improved quail habitat.

It is also important to understand that we were able to implement a level of predator removal that would be difficult, if not impossible, for the average landowner to achieve, because we used full-time, paid trappers outside the normal trapping season. Most landowners will never implement such a full-scale effort at removing predators because of time and financial constraints. The take-home message from this work is that the control of mammalian predators alone will not improve quail populations, and I expect the level of mammalian predator control possible for the average landowner will have little effect on predator populations at all.

The situation regarding hawks is much different from that of mammals. Hawks, owls and other raptors are protected by federal law that has its foundation in the Migratory Bird Treaty Act (an international treaty and the highest form of law in the United States). Let's suppose for a minute the federal government would grant an exemption for killing raptors in special circumstances to increase quail populations.

Upland game enthusiasts and state wildlife agencies have worked for decades to build partnerships with habitat-oriented and bird conservation groups who are often made up of a mix of hunters and non-hunters. After all, habitat for quail and other game species is also habitat for high priority non-game wildlife species requiring the same conditions. Many members of these groups do not hunt, but support the role of hunting in wildlife management and share common interests with hunters in terms of managing quality wildlife habitats.

If we implemented programs designed to kill raptors in order to increase quail numbers, our agency and our hunters would immediately lose the support of many of these groups who have been good partners in our wildlife habitat enhancement efforts over recent years. The loss of partners and support from the general bird-loving public would far outweigh any minor benefits that quail might receive from fewer hawks. All this would occur without the existence of solid data showing that such control of birds of prey would even make a difference for bobwhites. And remember, this debate jumps over the huge hurdle of getting an exemption to the federal Migratory Bird Treaty Act to allow this control in the first place.

I sometimes wonder if the predator debate is not a serious waste of resources that could be better spent on habitat discussions and efforts. This is colored by my direct experiences hunting in the Great Plains over the last couple of decades where there are some of the densest populations of hawks, foxes, and raccoons I have ever seen. These areas also had quail populations that would make a North Carolina hunter feel like a kid at Christmas. What sets those areas apart is

Why Do Bobwhite Quail Form Coveys?
See Nature's Ways, page 43.

CAROLINA WHERE *the* BIRDS ARE NOT ALREADY FOUND.

MELISSA McGAW / NCWRC

that they contain large expanses of year-round bobwhite quail habitat. Also, finding a place to hunt in those states is much easier because of the greater quantity of habitat. Any North Carolina hunter who is not convinced habitat is the key ingredient needs to travel to these states and see for himself.

Year-round habitat must address a quail's needs in winter (food and cover for the leanest season), spring (courting and pre-nesting habitats), summer (nesting and chick-raising habitats), and fall (food and cover). There are few places left on the North Carolina landscape that provide all these components, but we do have examples of excellent quail habitat in the state with very high bird populations. Biologists know how to produce quail given enough resources, acreages, and commitment from the landowner. Most of these areas are on intensively managed private lands such as our Corporate CURE (Cooperative Upland Restoration and habitat Enhancement) farms or on private quail hunting areas in eastern North Carolina. This management is expensive and requires a commitment from the landowner and/or farmer that simply does not exist in most areas and cannot be easily paid for with the amount of public funds likely to be available anytime in the foreseeable future.

Historically high quail populations resulted from agricultural and forestry practices common in the late 1800s and early 1900s. Southerners at that time were working hard to clear and farm a mostly forested landscape. This work was done by hand and with work animals and created millions of acres of openings and near perfect "messy" edge habitat preferred by bobwhites. Row crop farming, grazing, and forestry of these times were not dominated by technology or machinery and not particularly manicured, efficient or clean. The resulting landscape of native grasses, briars, weeds, forbs and shrubs was very favorable for quail.

Things began to change in the years after the Great Depression and World War II when technology came onto the scene. Agricultural and forestry practices became more and more technologically advanced. It became "normal" practice to do things that manicured or "cleaned" the landscape in an unfavorable manner for quail, and quail numbers have simply followed these changes through time in the last half century. Because these land-use changes occurred for economic reasons, it will take new and economically sensible practices, implemented over huge areas, to increase bobwhite numbers.

Another neighboring state gives us an example of the importance of economics in the bobwhite equation. This state's overall quail population has declined just as much, if not more, than ours. First, through coincidence, one county in this southern state's Coastal Plain experienced an unusually high amount of timber harvest (thinning and clearcuts) in local pine timberlands due to timber market forces beyond anyone's control.

This timber harvest was followed by the use of an unusual combination of herbicides to control competition with replanted trees. These mixes were less lethal than normal for quail-friendly legumes and grasses. Secondly, two very large acreage landowners in the county implemented prescribed burning on several thousand acres. And thirdly, many local landowners implemented conservation practices, cost-shared by USDA Farm Bill funds, on croplands.

All of these changes came together at the same time for pure economic reasons in a perfect storm for bobwhite quail. Bobwhites temporarily responded to the unusual amount of new, quality habitats. One hunter reportedly found over 125 coveys and killed 225 quail in these areas last season. All of this occurred in an area very similar to our Coastal Plain landscape, which has millions of acres of row crop land and forest land managed for timber

For a landowner with sufficient acreage, money and will, biologists can produce quail. Some of the habitat work involves controlled burning (below) and the introduction of plants beneficial to bobwhites.

F. EUGENE HESTER

RODNEY FOUSHEE / NCWRC

WILDLIFE AGENCIES THROUGHOUT *the* SOUTH ARE WORKING

production. If this type of change to standard land management regimes were implemented over entire regions of Southern states, imagine the impact to quail populations!

There are two bobwhite worlds that exist today. In one world, intensive habitat management produces bobwhites given adequate landowner commitment, finances, and acres. Scores of these areas exist throughout the South, and we have many right here in North Carolina. The average hunter will not set foot on these, and if you have access to such areas count yourself among the fortunate few. What we should learn from these areas is that there is no mystery about how to produce quail—the challenge is paying for it over larger areas.

That leads us to world number two: "The Real World". This covers the vast majority of quail range where common land use practices are driven by economics that determine the fate of quail. Lands are managed here by farmers, ranchers, and forest owners in ways they believe are economically sound. Whether biologists, hunters, and wildlife enthusiasts agree with this management does not matter. Putting food on the table, sending children to college, and paying the loan on the tractor, truck, and seed comes first. I say this with no disrespect because I think most Americans would do the same.

To address quail in this "Real World", we are left with two options. One is to directly pay landowners for quail-friendly habitat. That has been done to varying degrees in many states, but it is expensive and rarely sustainable over the long-term. Some experts believe this is the future of quail management and the only chance for the species. Time will tell if they are right, and at least we have this option.

I still have hope of another promising option. If adopted, it would be more sustainable over time and benefit more acres, people, and other wildlife species. It involves finding economically sensible alternatives to current land management practices. No-till planting, filter strips on cropland, conversion of sod-forming fescue and Bermuda grass to native bunch grasses, and thinning and burning of woodlands are examples. These practices benefit not just quail but a host of declining species.

Unfortunately, these and other practices are not common on a high percentage of our landscape. Perhaps we have not identified the right practices or presented the right economic arguments. Clearly, we have a long way to go in terms of reaching out to landowners and developing reasons for them to change standard practices. We must continue to search for more information about economically smart land management alternatives and hope for a little luck along the way.

For quail and associated species to ever recover, Government agencies, quail hunters, songbird enthusiasts, and landowners must all work together to find these economically sensible reasons for private landowners to do things differently. Changes must address practices on crops fields, pastures, and forested lands. It will take a combination of persistence, hard work, and planning for bobwhites to once again return to prominence in North Carolina and throughout their range in the South.

Mark D. Jones is the supervising wildlife biologist in the N.C. Wildlife Resources Commission's Private Lands Program. Jones also serves as the editor of the Upland Gazette.

Corporate CURE:

Growing Quail in a Growing Partnership

A unique partnership that started between the N.C. Wildlife Resources Commission and Murphy-Brown, LLC, a large hog-farming corporation, has morphed into a wildlife habitat focal area that includes 22 farms with multiple landowners. The emphasis here is to promote and protect water quality while providing much needed early successional habitat for species like bobwhite quail.

Currently, on over 15,000 acres of farmland, there are 262 acres of field borders, 189 acres of fallow habitat areas, 75 acres of native grasses planted, and 170 acres of longleaf pine restored. Quail response on the original farm has been very good, with surveys indicating that covey counts now average 5.5 coveys per point.

The commission recently implemented permit quail and rabbit hunts on these farms to provide sportsmen a return on the investment in this project and show that small game management can be successful on today's North Carolina landscape.

on "QUAIL PLANS" DESIGNED *to* ADDRESS *the* PROBLEM.

She was a scientific illustrator, a teacher and a writer. But above all, Anna Botsford Comstock was

A Lifelong Naturalist

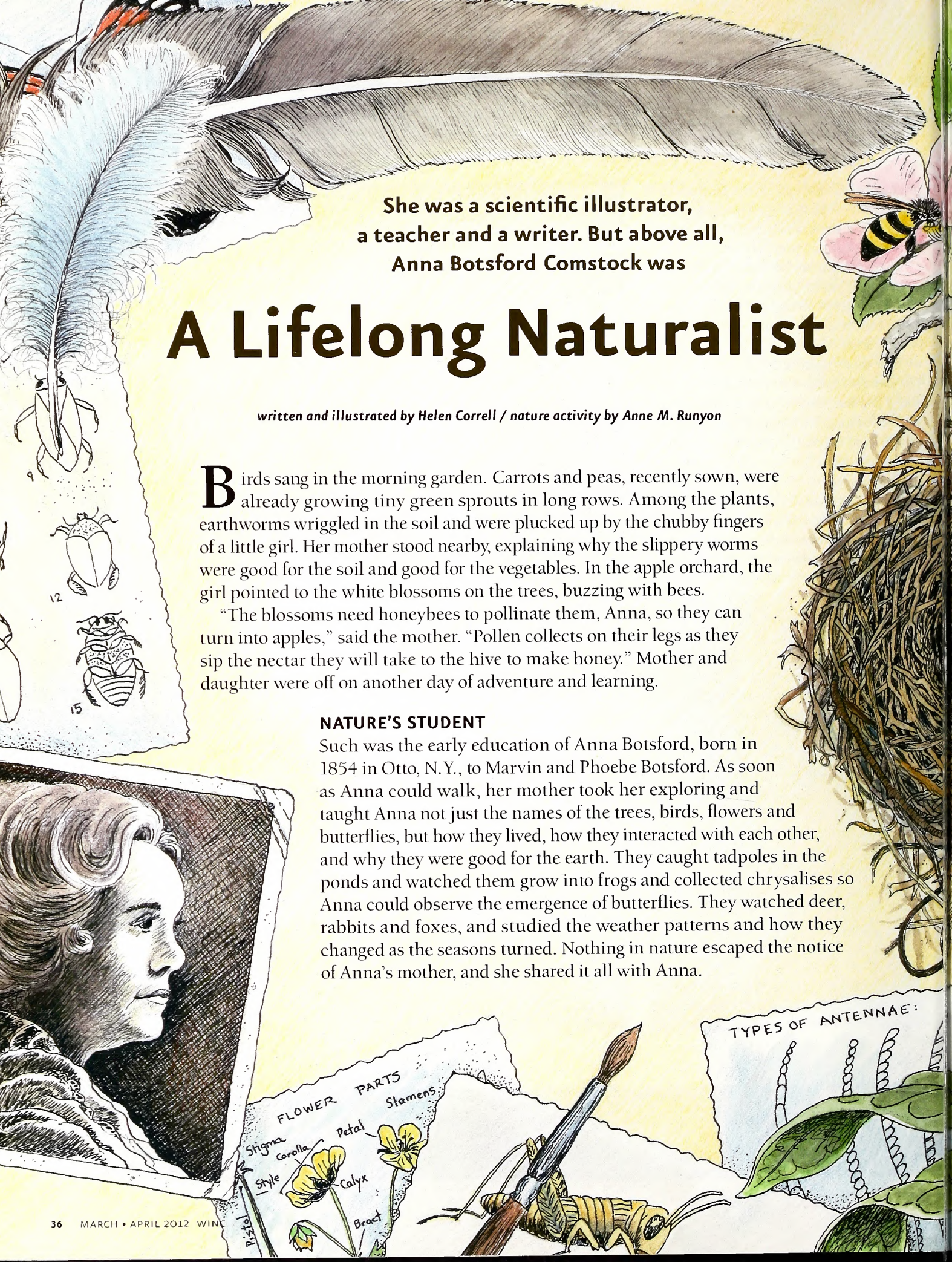
written and illustrated by Helen Correll / nature activity by Anne M. Runyon

Birds sang in the morning garden. Carrots and peas, recently sown, were already growing tiny green sprouts in long rows. Among the plants, earthworms wriggled in the soil and were plucked up by the chubby fingers of a little girl. Her mother stood nearby, explaining why the slippery worms were good for the soil and good for the vegetables. In the apple orchard, the girl pointed to the white blossoms on the trees, buzzing with bees.

"The blossoms need honeybees to pollinate them, Anna, so they can turn into apples," said the mother. "Pollen collects on their legs as they sip the nectar they will take to the hive to make honey." Mother and daughter were off on another day of adventure and learning.

NATURE'S STUDENT

Such was the early education of Anna Botsford, born in 1854 in Otto, N.Y., to Marvin and Phoebe Botsford. As soon as Anna could walk, her mother took her exploring and taught Anna not just the names of the trees, birds, flowers and butterflies, but how they lived, how they interacted with each other, and why they were good for the earth. They caught tadpoles in the ponds and watched them grow into frogs and collected chrysalises so Anna could observe the emergence of butterflies. They watched deer, rabbits and foxes, and studied the weather patterns and how they changed as the seasons turned. Nothing in nature escaped the notice of Anna's mother, and she shared it all with Anna.



FROM STUDENT TO TEACHER

By the time she was 14, Anna knew more of the workings of the countryside where she lived than did most of the adults who lived in Otto. There were times when Anna was asked to be a substitute teacher in the local school, and after math and spelling lessons she always took the class out to explore. She taught the class about the trees, flowers and insects, just as her mother taught her. She wanted the students to not just learn about nature, but to experience nature. At age 18 she became a full-time teacher. In 1874, Anna enrolled at Cornell University, one of the first American universities open to women.

INSECT ILLUSTRATOR

One of Anna's favorite classes at Cornell was invertebrate zoology, taught by John Henry Comstock. While taking his class she became fascinated with insects and decided to major in entomology, the study of insects. Their shared interest often brought John and Anna together, and eventually they fell in love. They married in 1878.

For the next two years, John Comstock served as chief entomologist at the U.S. Department of Agriculture in Washington. Anna began illustrating John's publications on entomology with detailed drawings of the bugs she loved. After they returned to Cornell, Anna studied wood engraving, and earned a bachelor's degree in natural history. She continued to illustrate her husband's books, lecture on science education at the teachers' college in New York, and work untiringly to promote nature study in New York state schools.

A NATURE WRITER

In 1895, Anna became the first woman professor at Cornell University. Around this time, many farms in New York were being deserted as families moved into nearby cities. As a member of the New York Society for the Promotion of Agriculture, Anna began to talk about the problem with school teachers. They decided if children knew more about nature, they might be more interested in farming and slow the loss of New York's farms. Using her interest in nature and her many talents, Anna helped create the Nature Study Movement, which "sought to instruct children about the relationship between farming and the study of nature."

Anna began writing and illustrating a book called "Handbook of Nature Study." Its purpose was to educate teachers about nature so that they could pass on their knowledge to students in the field, giving the children a hands-on learning experience that was similar to the way Anna learned as a child.

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ONE OF NATURE'S HEROES

Anna's book ended up being over 900 pages long! When she tried to get it published, every publisher she approached turned it down. One that responded positively told Anna that to be published she would have to cut the book by half, something Anna refused to do. Eventually Anna and John decided if no one else would publish it, they would do it themselves. They started Comstock Publishing in their basement, and published "Handbook of Nature Study" in 1911. Teachers the world over bought Anna's book to use in their classrooms.

Anna continued her busy schedule for the rest of her life, working as a scientific illustrator for books, a teacher, a publisher, and as a leader in the nature study movement. She received many honors, including induction into the National Wildlife Federation's Conservation Hall of Fame. In 1923 the League of Women Voters named Anna Botsford Comstock as one of the 12 greatest living women in the country. She died in August of 1930.

Read and Find Out

- "Handbook of Nature Study" by Anna Botsford Comstock, Yokai Publishing, 2010. This is a facsimile reprint of the original book, available through Amazon.
- "Girls Who Looked Under Rocks: The Lives of Six Pioneering Naturalists" by Jeannine Atkins, Dawn Publications, 2000.
- "The Kids' Nature Book: 365 Indoor/Outdoor Activities and Experiences" by Susan Milord, Williamson Publishing Company, 1996.
- "Fun With Nature" by Mel Boring, Diane Burns and Leslie Dendy, Cooper Square Publishing, 1998.

Find out more about Project WILD Workshops and literature at the Wildlife Commission's website at ncwildlife.org.

Get Outside

Make a wildlife list for your backyard using the categories in Anna's Handbook of Nature Study: Birds, Fish, Amphibians, Reptiles, Mammals, Insects, Wildflowers, Weeds, Garden Flowers, Trees, Flowerless Plants (e.g.: ferns, moss, mushrooms). If any are new to you, take the time to look them up either online or in a field guide. Ask your friends to make a list for their yard, and then compare the lists and the yards to learn what likes to live or grow in sun, in shade, in dry soil, or in wet soil.

Birds	Reptiles/ Amphibians	Mammals	Insects
Cardinal Blue Jay	Green Anole	Dog Squirrel Chipmonk	Bumble Bee Mosquito
Trees	**Wildflowers**	**Mushrooms**	**Other**
Oak, red Maple Hickory	Goldenrod Dandelion	Big white	

The Wildlife Endowment Fund

An Investment for the Future

Established in 1981, the Wildlife Endowment Fund allows the Wildlife Resources Commission to accept tax-deductible contributions for wildlife conservation. Money from the sale of lifetime licenses is also placed in this fund. Your donation or purchase will ensure that North Carolina will have a rich wildlife heritage for generations to come.

Lifetime License Form

Infant and Youth *(check appropriate block)*:

☐ Sportsman Infant $200
(under 1 year old—Application must be received before applicant has attained 1 year of age.)

☐ Unified Sportsman/Coastal Recreational Fishing Infant $275
(under 1 year old—Application must be received before applicant has attained 1 year of age.)

☐ Sportsman Youth $350
(ages 1 through 11—Application must be received before applicant has attained 12 years of age.)

☐ Unified Sportsman/Coastal Recreational Fishing Youth $450
(ages 1 through 11—Application must be received before applicant has attained 12 years of age.)

A copy of the birth certificate must accompany applications for infant and youth licenses. Birth certificate documentation cannot be returned.

Note: Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult who is properly licensed to hunt in North Carolina. "Accompanied" is defined as maintaining a proximity to the hunter which enables the adult to monitor the activities of, and communicate with, the hunter at all times.

Adult (age 12 or older) *(check appropriate block)*:

☐ Comprehensive Inland Fishing $250
(N.C. residents only—includes basic inland fishing, trout & trout waters on game lands)

☐ Comprehensive Hunting $250
(N.C. residents only—includes basic hunting, big game, game lands & N.C. waterfowl)

☐ Sportsman $500
(N.C. residents only age 12 or older—includes basic hunting & inland fishing, big game, game lands, trout & N.C. waterfowl)

☐ Coastal Recreational Fishing $250
(N.C. residents only—includes coastal recreational fishing)

☐ Unified Sportsman/Coastal Recreational Fishing $675
(N.C. residents only—includes same privileges as the Sportsman, plus coastal recreational fishing)

A federal waterfowl stamp must be purchased separately for all N.C. hunting licenses.

Note: On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or by signing the statement below that he or she had such a license.

Check appropriate block and attach required copy:

☐ Copy of Prior Year Hunting License

☐ Copy of Hunter Safety Certificate of Competence

☐ In lieu of copy, I am signing the statement below:

Statement: I certify that I was a licensed hunter prior to July 1, 1991.

Signature _____ Date _____

Visit us online at www.ncwildlife.org or call 1-888-248-6834 for a complete list of lifetime licenses, including those for nonresidents and 65 and older.

Lifetime License

Complete the following information if applying for a lifetime license. Be sure to check appropriate block(s) on reverse side *(please print legibly)*:

Name of Applicant _____

Daytime Phone _____

Mailing Address _____

Resident Address _____

County _____ Date of Birth _____ Driver License # _____

E-mail Address _____

Is this license a gift? ☐ Yes ☐ No If yes, mail license to ☐ Donor or ☐ Applicant.

License Donor's Name (*if applicable*) _____

Donor's Telephone # _____

Donor's Mailing Address _____

City _____ State _____ Zip _____

Method of Payment: ☐ Check ☐ VISA ☐ MasterCard

Acct. # _____ Expires _____

Print name exactly as it appears on credit card _____

Cardholder's Signature _____ Date _____

Personalize your Lifetime License for an additional $5:
Indicate your selection of letters, numbers, dashes, periods, commas and /or blanks up to 6 spaces: __ __ __ __ __ __

Indicate your personal message including letters, numbers, dashes, periods, commas and /or blanks up to 21 spaces:

__ __ __ __ __ __ __ __ __ __ __
__ __ __ __ __ __ __ __ __ __

Signature of Applicant or Donor _____ Date _____

Note: Only adult lifetime licenses may be purchased by phone or online (VISA or MasterCard only). Call toll-free (1-888-248-6834) or visit us at www.ncwildlife.org. Use this form to purchase infant and youth lifetime licenses by mail.

Tax-Deductible Contribution

☐ I wish to make a tax-deductible contribution to the Wildlife Endowment Fund. Enclosed is my check for $ _____. *(Credit card payments cannot be accepted.)*

Name _____

Daytime Phone _____

Mailing Address _____

City _____ State _____ Zip _____

Make checks payable to: *Wildlife Endowment Fund*

Transactions are not considered final until the check has cleared the bank. Items purchased with a returned check will be made invalid. A service charge of up to $25 will be charged on any returned check. (N.C.G.S. 25-3-506)

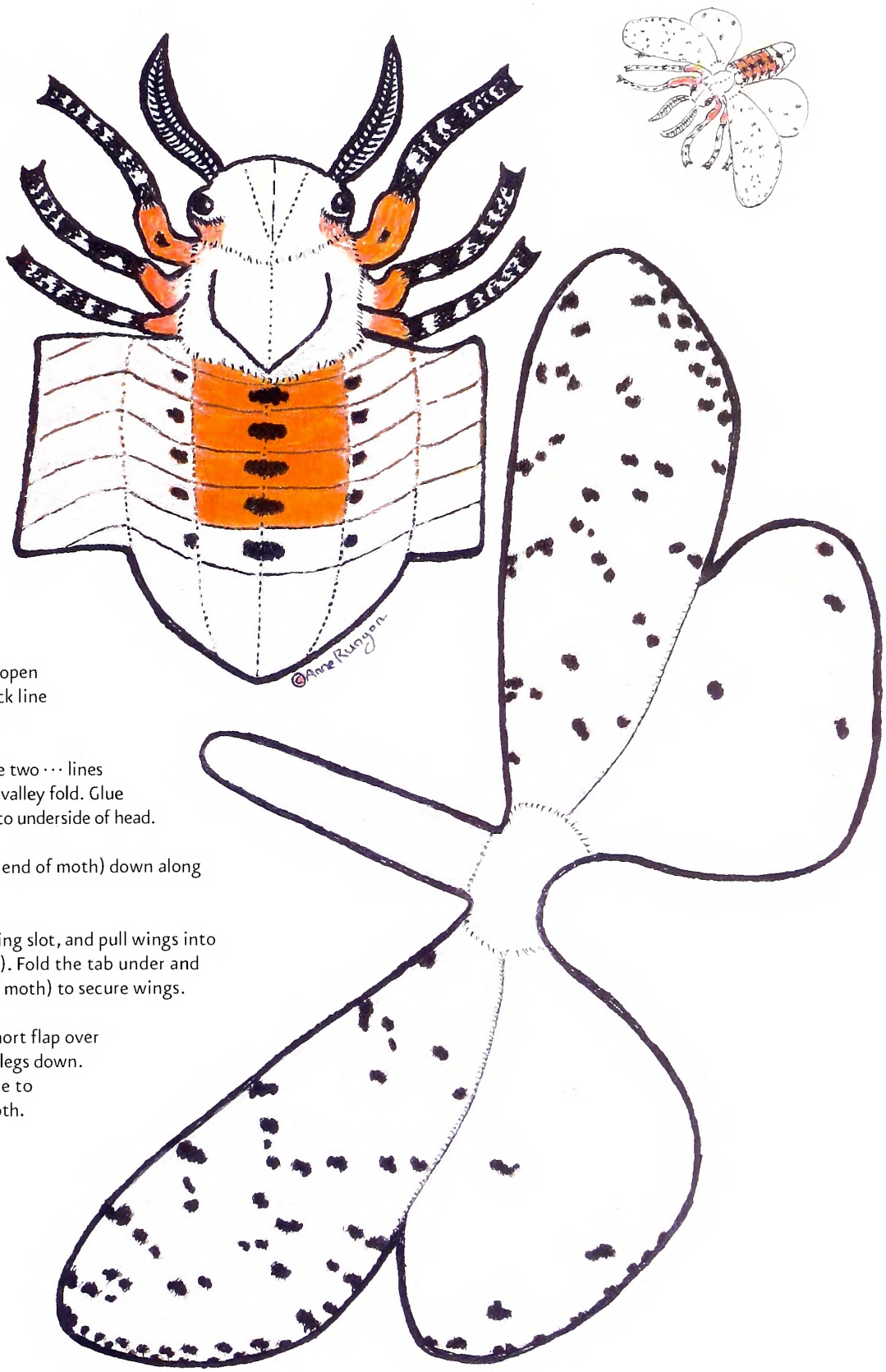
Mail completed application and payment to:
NCWRC, License Section, 1707 Mail Service Center, Raleigh, NC 27699-1707

Office location: *NCSU Centennial Campus, 1751 Varsity Drive, Raleigh, N.C. 27606*
Telephone: 1-888-248-6834 (2HUNTFISH)

Make a Salt Marsh Moth Paper Sculpture

(based on a female *Estigmene acrea*)

In 1864, growing up on a farm in Otto, N.Y., young Anna Botsford might well have discovered this tiger moth laying eggs on weeds, and later in the season found its bristly caterpillars munching her garden plants. These moths are also common here in North Carolina.



1) Cut out wings along thick black line. Fold long tab down (under wings) and set aside.

2) Cut out body along thick black line. Be sure to cut the slits between the four back legs.

3) Fold body in half along ··· line. Cut open wing slit on the back, following black line on one side of folded body. Unfold.

4) To sculpt head, pinch down along the two ··· lines on forehead, pushing - - - line into a valley fold. Glue the valley fold shut, and then glue it to underside of head.

5) To sculpt body, fold abdomen (hind end of moth) down along the four slightly curving ··· lines.

6) Next insert the long tab into the wing slot, and pull wings into place (long forewing close to head). Fold the tab under and tape it to thorax (middle section of moth) to secure wings.

7) Turn moth upside down and glue short flap over longer flap to finish abdomen. Fold legs down. Fold antennae and wings up a little to complete your female salt marsh moth.

back porch

NEWS and NOTES

Edited by Mike Zlotnicki

The "On the Road, On the Water, Don't Drink and Drive" campaign is back.

MELISSA McGAW / NCWRC

After a successful inaugural effort last summer, this multi-agency initiative to combine law enforcement resources to ensure that everyone can safely travel on highways and waterways during the summer months will resume in 2012. The campaign primarily consists of officers conducting sobriety checkpoints and special saturation patrols on busy holidays, combined with special messaging strategies to increase awareness of the dangerous consequences of impaired operation.

North Carolina sets the same limits for intoxication while operating a boat as for operating a motor vehicle: You can be charged if your blood-alcohol concentration meets or exceeds .08 or if you are appreciably impaired by alcohol and/or drugs.

The agencies involved are the N.C. Wildlife Resources Commission, responsible for boating safety; the State Highway Patrol, promoting highway accident reduction; Alcohol Law Enforcement, with a zero tolerance for underage drinking; and local police and sheriff's offices, who work for public safety in their communities. The Forensic Tests for Alcohol Division assists by providing personnel and mobile units. Support comes from state and national chapters of Mothers Against Drunk Driving and the North Carolina Conference of District Attorneys.

"On the Road, On the Water agencies and organizations ask that drivers be responsible, no matter what they drive," said Col. Dale Caveny, chief of the Division of Law Enforcement of the Wildlife Commission. "The educational component of the campaign is to try and motivate people to not operate a vessel or vehicle if they're impaired."

Part of a deterrent, educational strategy is developing public information to advance the message. Alcohol affects the skills necessary to operate vehicles.

"More than 20 percent of boating-related fatalities are alcohol related," said Lt. Todd Radabaugh, a wildlife officer in Pender County and the state's lead instructor for boating-under-the-influence detection training. "Sun, wind and waves, noise, vibration and motion can create a condition known as boater fatigue, which can magnify the effects of alcohol. Being inebriated is dangerous for everyone onboard."

"If you are at the helm, you are responsible for your vessel and the passengers onboard. That is the duty of a captain."

The campaign will focus on three summer holiday periods; Memorial Day, Independence Day and Labor Day.

As a result of the inaugural campaign, 1,141 impaired vessel and vehicle operators were removed from North Carolina's roads and waterways. A huge component of the campaign is education. And that is why the slogan fits perfectly: On the Road, On the Water, Don't Drink and Drive.

e NEWSLETTER

Get N.C. Wildlife Update—news including season dates, bag limits, legislative updates and more—delivered to your Inbox from the N.C. Wildlife Resources Commission. Sign up at ncwildlife.org/enews.

Becoming an Outdoors-Woman Workshop is Always a Popular Event

The Becoming an Outdoors-Woman program will hold its annual weekend workshop on April 13–15 at the Eastern 4-H Conference Center in Columbia, N.C. The workshop includes expert instruction in activities ranging from fishing and target shooting to outdoor cooking and bird watching.

Cost is $225 per person and will cover a choice of four outdoor skill sessions, all program materials and use of equipment, plus meals and lodging. Amenities at the Eastern 4-H Conference Center include climate-controlled living quarters, private showers and dining hall. The 250-acre facility boasts a spectacular view of Albemarle Sound and access to nearby woodlands, meadows, pocosin forests, wetlands and tributaries.

"It's a beautiful setting—perfect for learning these outdoor skills," said BB Gillen, the Wildlife Commission's outdoor skills coordinator. "The boardwalks, nature trails and boat docks provide easy access to the surrounding natural areas."

Space is limited and registration is on a first-come, first-served basis.

"The camaraderie of BOW is great and the no-pressure learning environment makes it fun," Gillen said. "A gift certificate is an ideal present for any woman wanting to explore nature and expand her knowledge and skills."

Becoming an Outdoors-Woman is an international program for women, 18 and older, to learn outdoor skills through hands-on experiences in a variety of outdoor instructional activities, such as archery, paddling, wildlife photography, outdoor cooking, tracking and map-and-compass work, or orienteering. In North Carolina, the program is administered by the Wildlife Commission.

For more information, contact Gillen at 919-218-3638 or bb.gillen@ncwildlife.org. BOW gift certificates may be purchased at the online store, ncwildlife.org.

IN SEASON

In March and April, these seasons are open in North Carolina:

Light Geese (Snow, Blue and Ross'): Through March 10. Electronic calls and unplugged guns are allowed.

Wild Turkey: Youth Day (male or bearded turkey) April 7; Statewide Spring Season April 14–May 12; daily limit 1, possession limit 2

Roanoke River Striped Bass Management Area: March 1–April 30 (unless closed by proclamation). 18-inch minimum, no fish between 22–27 inches, only 1 greater than 27 inches

There is no closed season or bag limit for groundhog, coyote, striped skunk, nutria and armadillo. There is an open season for taking beaver with firearms or bow and arrow during any other open season for the taking of wild animals.

Check the *2011–2012 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit ncwildlife.org.

Now Is the Time for a Boating Safety Education Course

NCWRC

In anticipation of warmer weather and the upcoming boating season, Wildlife Officers are reminding boaters—and would-be boaters—about state requirements to be at the helm.

General Statute 75A-16.2, known as the Boating Safety Education Law, requires anyone younger than 26 operating a vessel powered by a 10 horsepower or greater motor on public waterways to have successfully completed an approved boating safety education course or otherwise be in compliance.

The law was passed by the General Assembly to improve safety on North Carolina waters and went into effect May 1, 2010. Courses must be accredited by the National Association of State Boating Law Administrators. Instruction covers navigation, proper vessel operation, and safety and legal obligations. Violation is an infraction, subject to a citation and a court appearance.

Getting into a course is easy. The N.C. Wildlife Resources Commission administers free boating safety education courses throughout the year, all across the state. To check course availability, go to ncwildlife.org or call 919-707-0031. The U.S. Coast Guard Auxiliary, U.S. Power Squadron and other organizations, including Internet providers, also offer approved courses that can include a fee. All courses have a standardized test.

All vessel operators must be able to prove compliance, such as showing a certification card and valid ID, upon request of a law enforcement officer. Wildlife Officers enforce the boating laws and regulations on the waters of North Carolina, and may stop any vessel for safety checks or violations. They patrol more than 5,000 square miles of inland streams, rivers, lakes and coastal waterways, and the 200-plus public boating access areas maintained by the Wildlife Commission.

Among the safety regulations covered under course instruction are state and federal requirements for life vests, such as how children younger than 13 must wear an appropriate, USCG-approved life vest whenever they are on a recreational vessel that is underway, including non-motorized craft. Sailboards, racing shells, rowing sculls, racing canoes and racing kayaks are exempt from requirements.

Navigational regulations covered include buoy identification, inland lighting rules, how to pass other vessels and that North Carolina sets the same limit for intoxication while operating a boat as for a motor vehicle, with a .08 blood alcohol level, or if an operator is impaired by alcohol and/or drugs.

CALENDAR OF EVENTS

Friday–Sunday, March 2–4

The 32nd Annual Dixie Deer Classic will feature special guests Ralph and Vickie Cianciarulo of "Archer's Choice," Greg and Jake Miller of "In Pursuit" and Melissa Bachman of "Outdoor TV." The N.C. State Championship Turkey Calling Contest will take place as well. Visit dixiedeerclassic.org.

Friday–Sunday, March 16–18

The Cape Fear Wildlife Expo will feature wildlife art and decoy displays, hunting and fishing products, boats and accessories, truck and ATV displays, fly-fishing and decoy-carving demonstrations, conservation exhibits, outdoor guides and outfitters. Visit capefearwildlifeexpo.com.

Saturday, March 17

The Get Hooked Fishing School at the North Carolina Aquarium at Pine Knoll Shores is a one-day course packed with presentations from the pros on a wide variety of topics and types of fishing, including surf fishing, fly fishing and kayak fishing. Call 252-247-4003 to register by phone or online at reservations.ncaquariums.com/pineknollshores.

Sunday, May 6

The Cape Fear Garden Club is hosting the Lower Cape Fear Bird Islands Cruise. On May 6 at 1 p.m., the Winner Cruise Queen will depart Carolina Beach Marina for a four-hour cruise to nesting islands in the Lower Cape Fear River. Visit capefeargardenclub.org for more information.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to mike.zlotnicki@ncwildlife.org, or call 919-707-0175.

Commission's *Upland Gazette* Available Online and in Print

The N.C. Wildlife Resources Commission offers a newsletter published each spring and fall for anyone interested in wildlife species and the habitat they need to live in the Tar Heel state.

The *Upland Gazette* is in its 17th year of providing North Carolinians information about bobwhite quail, rabbits, other small game wildlife, songbirds, and many other species. Articles provide land management advice, updates on wildlife species status, results of recent wildlife research, and timely information on issues impacting wildlife and habitat.

The *Upland Gazette* has transitioned from a paper-only publication to one also available online. Online readers can access each issue of the Upland Gazette for free at http://216.27.39.103/UplandGazette.aspx.

Issues from 1996 through 2011 have been posted on the site, and the most recent issue includes articles addressing the bobwhite quail decline, a landowner success story about restoring wildlife habitat, notes about rabbits and grouse chicks and Conservation Reserve Program. While visiting the website, be sure to sign up for new-issue email notices.

For those who prefer a paper version, a yearly subscription to the *Upland Gazette* costs $5. Subscriptions can be ordered from the website above or by calling 1-866-WILDSHOP (1-866-945-3746).

Check-off to Help Wildlife

Helping conserve North Carolina's nongame and endangered wildlife species is as simple as checking a box.

By checking line 28 on your North Carolina State Income tax form this year, you can help the N.C. Wildlife Resources Commission fund research, conservation and monitoring projects that benefit animals not hunted or fished.

Online tax preparation software, such as TurboTax, does not have numbered lines so e-filers will be asked if they would like to make a donation to the Nongame and Endangered Wildlife Fund. Other tax filers can also tell their tax preparer they would like to donate. Every dollar of your tax check-off donation goes to the Commission's Nongame and Endangered Wildlife Fund, where it matches federal and other grants, or is used to fund educational activities and watchable-wildlife projects like the North Carolina Birding Trail.

NORTH CAROLINA NONGAME & ENDANGERED WILDLIFE FUND

For more information about the program, go to ncwildlife.org.

Correction

In the January/February issue of *Wildlife in North Carolina* we misspelled the name of an Honorable Mention winner in the Youth Photographer 13–17 category. Our apologies to Anne Blythe Davis, who "goes by Anne Blythe."

In the 12 and Under Category, two grasshopper photos had the photographers' names switched. The photos are as follows:

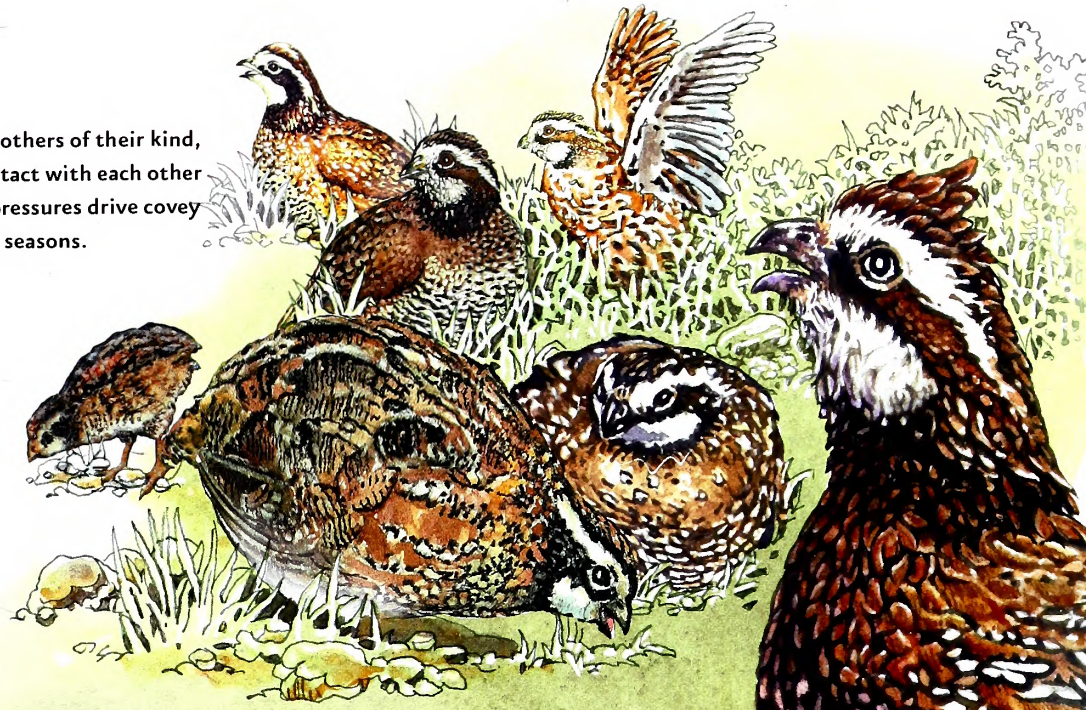
Darren Germann

Ethan Whitaker

Why Do Bobwhite Quail Form Coveys?

written by Clyde Sorenson
illustrated by Jim Brown

MANY, IF NOT MOST, birds flock with others of their kind, but few spend as much time in intimate contact with each other as bobwhites. Several important adaptive pressures drive covey formation in quail during the non-breeding seasons.



One of the most important reasons quail associate is that there is indeed safety in numbers. At any given time in a group of foraging quail, one or more individuals are almost always watching for predators, allowing the others to feed more efficiently.

Birds in a group also tend to eat more than quail isolated from others. This is not only related to the greater opportunity to forage described above; like us, quail observing others eating tend to eat, too, even if they are otherwise not hungry. Birds in groups therefore tend to store more of the critical energy they need to get through cold nights.

Unlike most other birds their size, quail typically roost on the ground; the fire-maintained ecosystems they evolved in don't usually offer much in the way of dense shrubs, so they seek dense ground covers. Roosting as a covey is the safest way to spend the night on the ground. Quail characteristically roost in a circle, with all heads facing out. Again, usually one or two birds are awake and vigilant at any given time — if they detect danger, they alert everyone else. Roosting in a circle, under protective vegetation, also preserves valuable heat and therefore conserves metabolic energy for the members of the covey. On colder nights they huddle closer together; on warmer nights, they spread out a bit.

The Accidental Angler

written by Jim Dean

On a balmy, blue-sky day last spring, I slipped the johnboat into a pond and sculled to the far corner of the dam where I expected to find bluegills spawning. I could see the shallow circular spawning beds that bluegills had fanned out on the sandy bottom with their tails. I had only a light fly rod, a few cork poppers and my favorite slow sinking, size 8 bream bugs with black chenille bodies and white rubber legs. This is low-tech angling for fish that might not be bigger than your hand, but the return on investment is supremely satisfying.

JIM DEAN

I had caught perhaps half a dozen when I saw something move nearer the bank. I made a longer cast to the spot and immediately hooked another bluegill that skittered across the surface and then disappeared in a washtub-sized swirl.

"Most big fish aren't overly picky when it comes to cannibalizing their own kind."

For a moment, I could feel only dead weight, then the line began to move off slowly into deeper water. Clearly a largemouth bass had inhaled my bluegill, and as I increased the resistance, it surged into the middle of the pond, yanking yards of line off the reel and towing me and the boat behind it.

Holy Cow! I said, or something like that. For several lively minutes, that bass went wherever it wanted to go (fish that size don't steer too well from the rod-end). Finally, I got it close enough to see that it would fill my net. At leader length, it finned quietly for a moment as we eyed each other. Then—as if in disgust—it simply opened its mouth and spit out the bluegill. I landed the bluegill, which was a bit scuffed up but otherwise OK. "You're lucky, little buddy," I said as I released it.

Any long-time fisherman knows that this kind of thing happens occasionally. Big fish are adapted to prey upon smaller fish that seem to be in trouble, and some of the biggest fish I've ever encountered have grabbed a smaller fish I'd hooked. Seldom, however, are these monsters actually landed, usually because your hook is embedded in that smaller fish's mouth. The biggest wild rainbow I've ever seen in North Carolina (I honestly think it might have weighed 7 or 8 pounds) ate a 9-inch trout I hooked in the Nantahala River. I played that huge rainbow so carefully that I doubt it even knew its meal was hooked. When the big trout was finally beside me only a few feet away, I could see the small rainbow crossways in its mouth. That whopper rainbow didn't want to give up that snack, but when it finally spotted me, it left in such a hurry its wide tail threw a bucket of icy water over me. I was a nervous wreck for a week.

Back in the late 1960s, the first sizeable brown trout I ever landed didn't actually eat the smaller trout I'd hooked on a dry fly, but while it was chasing my little trout around the pool, it grabbed the trailing nymph that I'd rigged in tandem behind the dry fly. Since then, I've "accidentally" caught several big trout this way, and chances are you have, too.

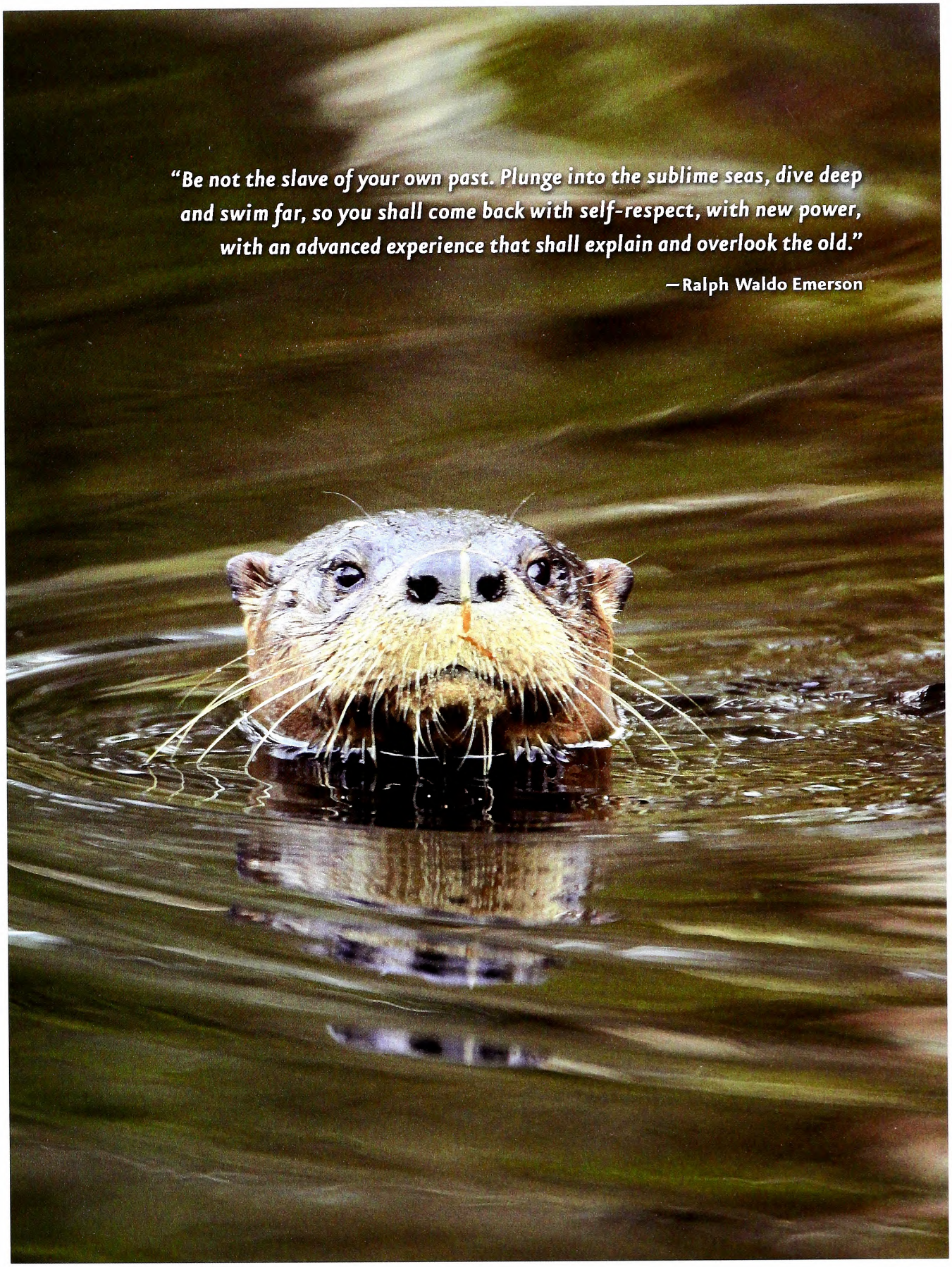
Most big fish aren't overly picky when it comes to cannibalizing their own kind. In Long Hope Creek many years ago, I found a pair of brown trout rolling weakly in a pool. The larger one, about 16 inches, had tried to swallow a brown about 12 inches long head-first, but hadn't quite been able to manage it, getting only the head jammed in its mouth. I was able to pull them apart and turn them loose.

There was also a memorable late fall day five or six years ago when Cam Cantwell and I were fly fishing for albacore a few miles off Cape Lookout in front of the lighthouse. Big schools of albacore were attacking bait-balls of anchovies as far as we could see, and sharks were cruising through the carnage. Many of the albacore we hooked were attacked by sharks. All you'd get back was a bloody head.

For a while, Cam was hooked up to a 12-foot hammerhead that finally broke free, and I had a big dusky shark grab one of my albacores. I was afraid the knot might fail where the backing was attached to an expensive fly line, so we cranked the outboard and chased that dusky for hundreds of yards before I could finally get my hands on the end of the fly line and break the leader.

Everywhere beneath the surface of the waters we fish, the wheel of life is relentless and certain. This past fall in Mexico where I was fly-casting for bonefish, big barracuda were common on the flats. If you hooked a bone and let him run too far, you were likely to have your sport end abruptly with a smashing strike. One afternoon, I watched a huge barracuda slash 100 yards through a massive school of baitfish, leaving a bloody trail.

It makes you grateful that you're not a fish. Very few ever die peacefully in their sleep.



TODD PUSSER

River Otter

OUTDOOR MOMENT

IN THE MAY · JUNE ISSUE

E. EUGENE HESTER

THE OWL AND I
What started as random sightings of a barred owl in a swamp developed into a remarkable relationship with a wild and beautiful bird.

THE JIG IS DOWN
When fishing — and catching — is your goal, forget the high-tech gadgets and tie on this simple little jig.

WHITE LIGHTNING
Thunderstorms are a common occurrence for outdoorsmen in the summer, but they can deliver one of the deadliest forces in nature.

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